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PART B

LAFAYETTE PLACE

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NOVEMBER 1978

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CITY OF BOSTON /
BOSTON REDEVELOPMENT AUTHORITY

HUD (CDBG)-R01-EIS-78-1D(Sup.)
Section 104h of the Housing and Community Development Act of 1974,
as amended
(Urban Development Action Grant Program)

LAFAYETTE PLACE

Draft Environmental Impact Statement Supplement

City of Boston
Office of Federal Compliance
Boston City Hall
1 City Hall Plaza, Room 960
Boston, Massachusetts 02201

Date: NOV 28 1978

Prepared by:

Boston Redevelopment Authority
Environmental Review Section
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1 City Hall Plaza
Boston, Massachusetts 02201

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INTRODUCTION

This document, published as a supplement to the Draft Environmental Impact Statement for the Lafayette Place development project in Boston, Massachusetts, dated July 1978, constitutes, when combined with the full text of the draft statement, the Final Environmental Impact Statement for the subject project.

This Supplement includes the following components:

- Summary description of the Lafayette Place project and its environmental impacts.
- List of agencies to whom the Draft EIS was submitted for comment.
- Description of project revisions and associated environmental impacts.
- Comments received from Federal, State, and local agencies respecting the Draft EIS.
- Responses to the comments received.

This document has been prepared pursuant to Section 102 (2)(c) of the National Environmental Policy Act of 1969 (P.L. 91-190) and in accordance with CEQ and HUD guidelines for the preparation of environmental impact statements and in accordance with HUD regulations respecting environmental review responsibilities for projects funded under the Community Development Block Grant Program of the Housing and Community Development Act of 1974, as amended. In addition, this document has been filed with the Massachusetts Executive Office of Environmental Affairs, pursuant to the Massachusetts Environmental Policy Act, General Laws, Chapter 30, Sections 61 and 62 to 62H, inclusive. The EOEA file number for this project is 03179.

On November 13, 1978, pursuant to 58.19(b)(3) of the "Environmental Review Procedures for the Community Development Block Grant Program" of HUD (24 CFR Part 58), an Addendum to the Draft EIS was published and was transmitted for review and comment to all parties to whom the Draft EIS was transmitted and to all parties who commented thereon. The Addendum consisted of Parts A and B of this Draft EIS Supplement. As of the end of the review period, no comments on the Addendum were received.

PART A SUMMARY SHEET

SUMMARY SHEET

Status:

Draft Environmental Impact Statement Supplement

Subject:

Lafayette Place
Boston, Massachusetts
Urban Development Action Grant Program

Responsible Agency:

City of Boston
Office of Federal Compliance
Boston, Massachusetts
(acting for U.S. Department of Housing and Urban Development, Boston Area Office, pursuant to Section 104 h of the Housing and Community Development Act of 1974, as amended)

Name of Action:

(X) Administrative ( ) Legislative

Brief Description of Action:

The proposed Lafayette Place development project represents a $115.35 million public and private investment program in the center of downtown Boston and encompasses a major retail/hotel complex, a new City garage, and ancillary public improvements. The project area, extending generally from Washington Street to Chauncy and Essex Streets and from Avon Street to Hayward Place and Exeter Place, encompasses approximately 6 acres of predominantly vacant land. The program's goals are to rejuvenate the retail area along Washington Street and to foster round-the-clock activity in the core of downtown Boston.

Key components of the Lafayette Place project include a 300,000 square feet retail center, 100,000 square feet of office space, a 500-room hotel tower, 1,500 parking spaces provided by a new underground garage and on-site locations, construction of a new east-west arterial street, and related project and other street improvements.

A Federal grant in the amount of $8,000,000 has been requested from the U.S. Department of Housing and Urban Development, under the Urban Development Action Grant Program, to assist in the implementation of the Lafayette Place development.

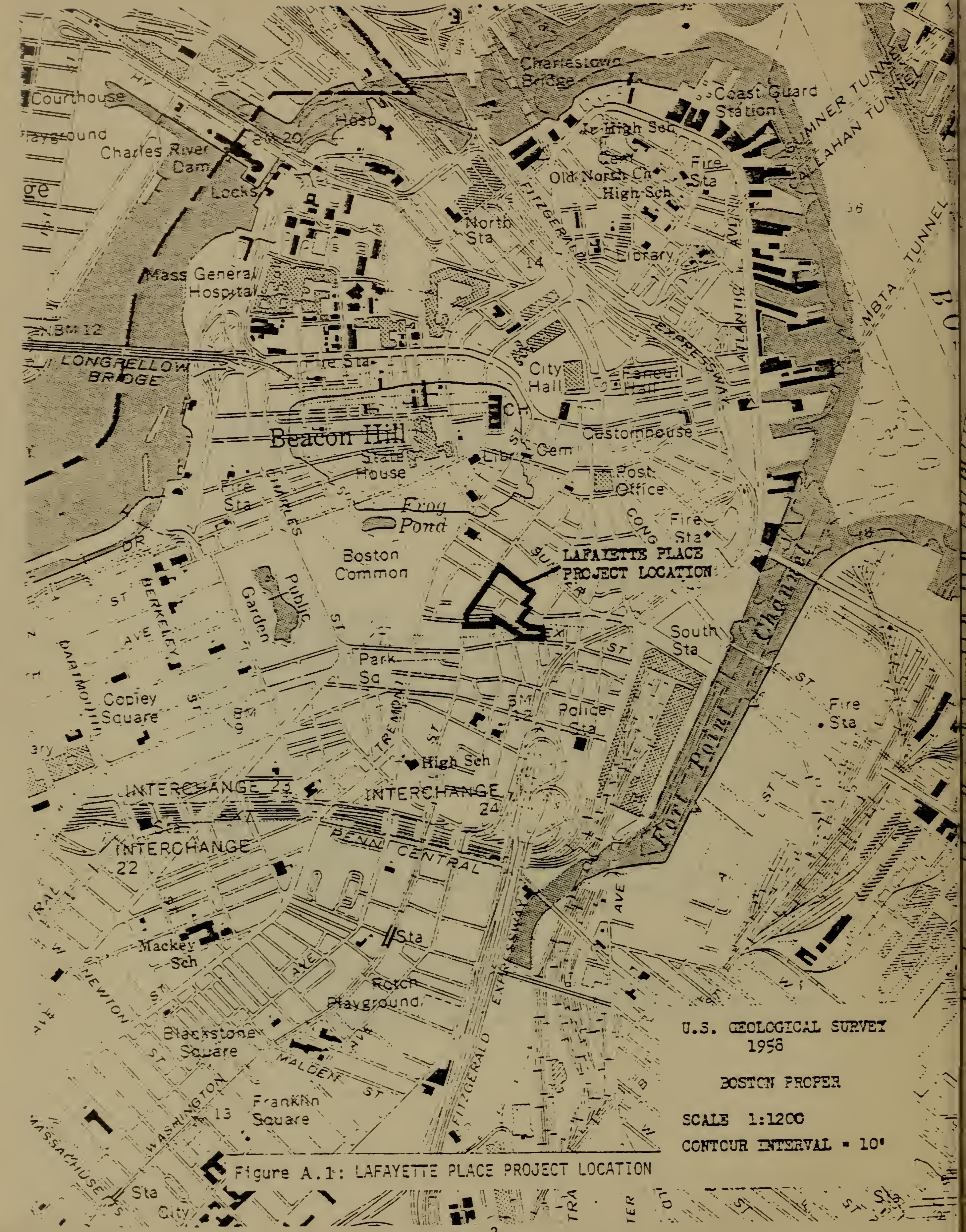
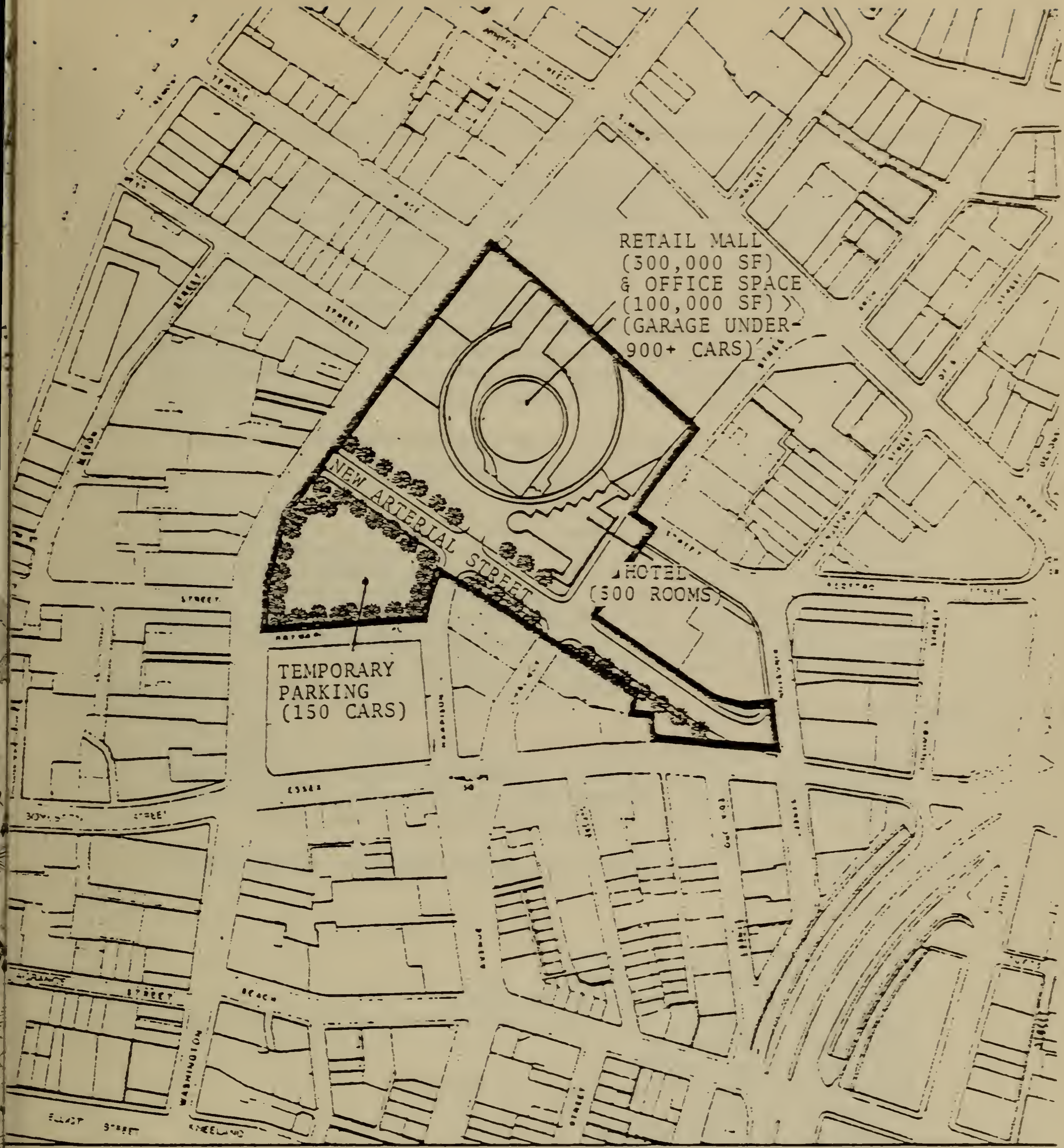


Figure A.1: LAFAYETTE PLACE PROJECT LOCATION



LAFAYETTE PLACE

PROPOSED SITE PLAN
(Revised 10/78)

Figure A.2

BOSTON REDEVELOPMENT AUTHORITY

Summary of Environmental Impact and Adverse Environmental Effects

The Lafayette Place project is designed to take advantage of an opportunity to continue and expand the revitalization of the retail core of Boston, and to strengthen its role as the central business district of the entire metropolitan area. Implementation of the proposed project, therefore, is expected to result in significant beneficial impacts for the City, including the removal of existing blighting and other adverse conditions on and adjacent to the project area, the economic renewal of the retail core, the strengthening of the City's tax base, the improvement of investment confidence, the arrest of continued deterioration in the area, and increased potential for redevelopment and rehabilitation in the general vicinity.

The principal adverse impacts of the project will occur during the construction period and will include increased air pollution and noise levels, the generation of solid waste and debris, temporary disruption of vehicular and pedestrian traffic, minor increases in water pollution potential, increased safety hazards, and the disturbance of ground water levels. Long-term negative impacts will be limited to increased vehicular traffic in the area, an increase in air pollution and noise levels, additional burdens on utility systems and energy resources, and potential effects on the adjacent Chinatown area. Mitigation measures are available and will be employed to minimize or avoid any adverse impact from the project.

Alternatives Considered:

Alternatives considered include a "No-Build" option, a development alternative of lesser and greater scales, and a development proposal with alternative uses. Consideration was also given to alternative sites for the project and alternative uses for the project site.

Federal, State, and Local Agencies from which Comments Were Requested:

Federal

Environmental Protection Agency
Council of Environmental Quality
Advisory Council on Historic Preservation
Department of Housing and Urban Development (informational only)
Department of Commerce
Department of the Interior
Department of Health, Education, and Welfare
Department of Labor
Department of Transportation
Energy Resource and Development Administration
Federal Aviation Administration
Federal Highway Administration
Community Services Administration

State

Executive Office of Environmental Affairs
Office of State Planning and Management
Metropolitan Area Planning Council
Massachusetts Historical Commission
Department of Community Affairs
Department of Commerce and Development
Department of Environmental Quality Engineering
Department of Public Works
Massachusetts Bay Transportation Authority
Attorney General
State Clearinghouse
Office of Coastal Zone Management

Local

Mayor's Office
Boston City Council
Boston Redevelopment Authority
Boston Conservation Commission
Boston Air Pollution Control Commission
Boston Landmarks Commission

Date Statement Made Available to EPA and Public

Draft: July 28, 1978
Final:

PART B REVISIONS TO PROJECT DESCRIPTION AND ASSOCIATED ENVIRONMENTAL IMPACTS

Part B REVISIONS TO PROJECT DESCRIPTION AND ASSOCIATED ENVIRONMENTAL IMPACTS

As a result of continuing studies by the Lafayette Place project developer of the financial feasibility of the project, the proposed development has been revised to include the addition of 100,000 square feet of office space, in four stories, above the retail core on Washington Street. The additional stories will add approximately 50 feet to the height of the project structure along the Washington Street facade. Approximately 85,000 square feet will be devoted to rental office space and 15,000 square feet to mechanical space. It is currently contemplated that this office space would be leased to a single tenant rather than be divided to serve a multiple number of firms. The estimated cost of the additional construction is $10 million. Construction would occur concurrently with the erection of the retail core and hotel and would be completed within the originally scheduled two-year construction period of the superstructure. An estimated 425 persons would be employed in this office space.

Figures B.1 to B.13, which follow, illustrate the most recent plans and designs of the Lafayette Place development project.

It also has been decided that the Hayward Place garage, because of its present condition and inefficiency and its potential adverse effect on the new development, should be demolished as early as possible and the vacated parcel be made available for additional development to tie into the Lafayette Place project. Although at this time no specific plans have been developed for this parcel, an extension of the retail center -- possibly a department store -- is presently considered the most appropriate reuse of this site. Until definitive plans are developed, the parcel is proposed to be used temporarily as a landscaped surface parking lot for approximately 150 cars, which would fulfill a portion of the parking requirements for the Lafayette Place project that would be lost with the demolition of the Hayward Place garage. Some additional parking spaces also may be included in the Lafayette Place garage, but the exact number would depend on detailed design development of the garage and more definitive layout of the parking spaces. In any case, the total number of project parking spaces would not exceed the 1,500 spaces originally proposed. A specific discussion of the alternative proposal for the Hayward Place garage site was included in Part III of the Draft E.I.S. - Alternatives to the Proposed Project.

In addition, since publication of the Draft Environmental Impact Statement, the schedule of project activities and details of the project financing have been modified. An updated project activities schedule follows:

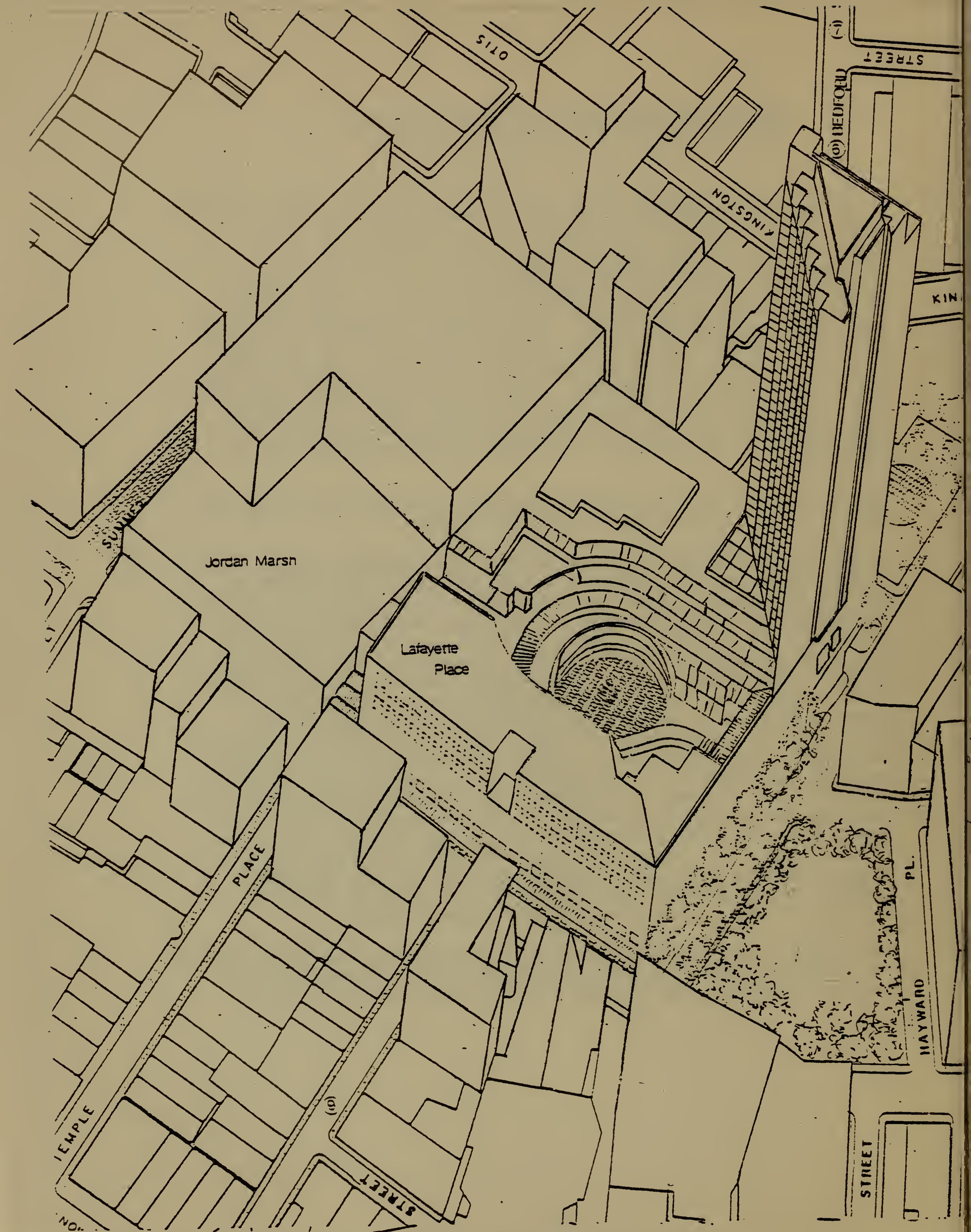


Figure B.1: Lafayette Place - 3-Dimensional Perspective

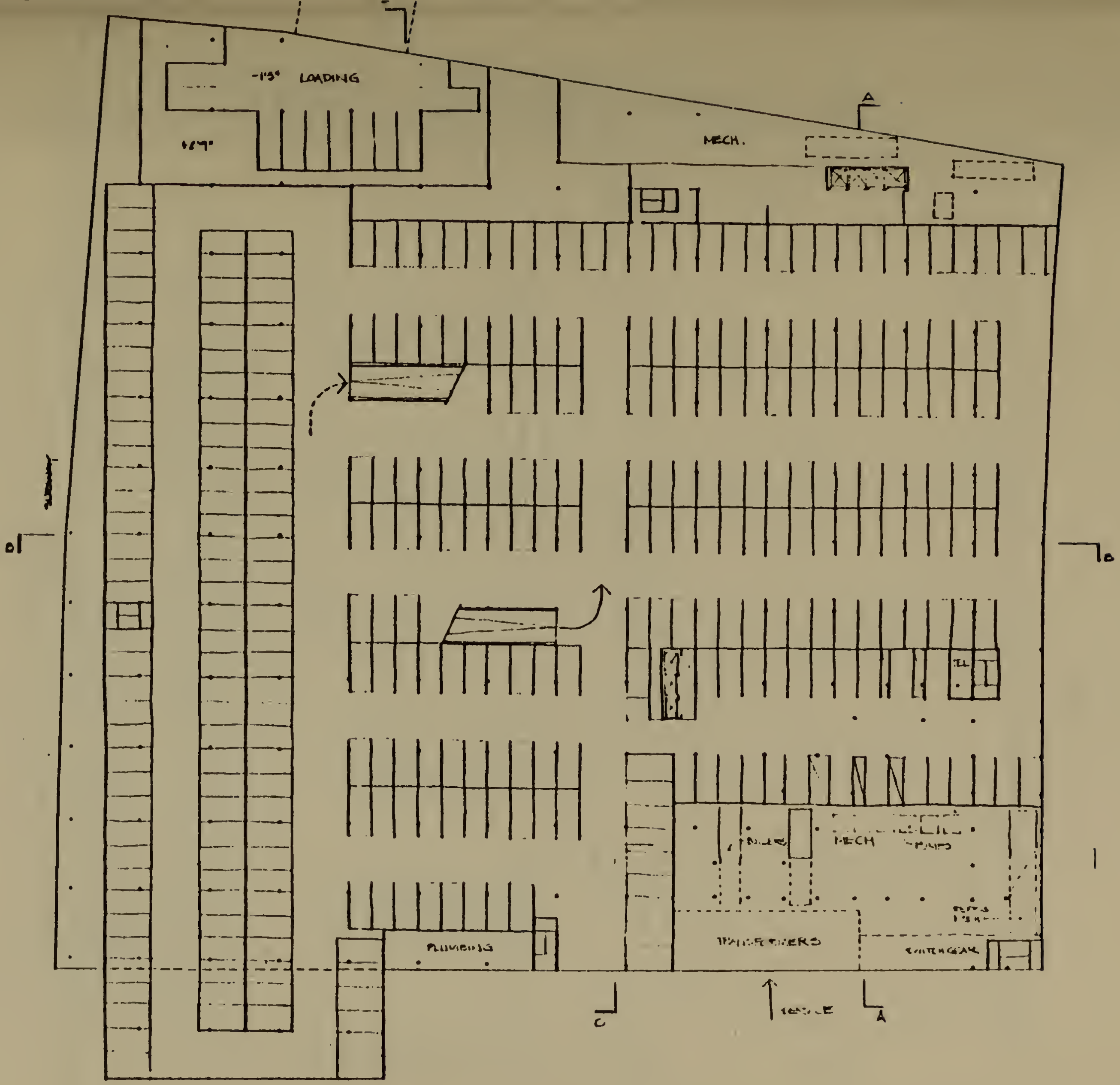


Figure B.2: LAFAYETTE PLACE - Plan at Parking Level-3

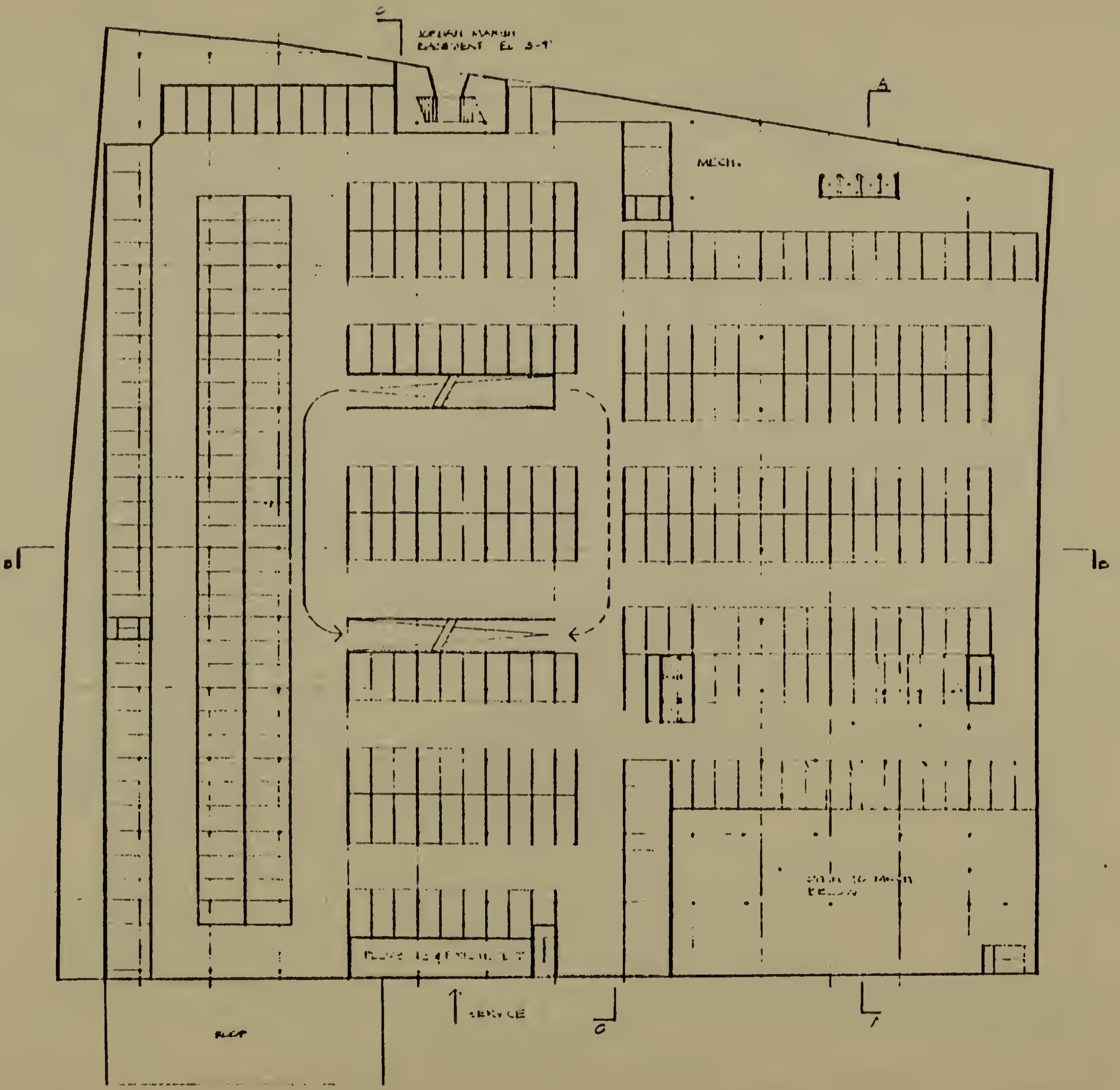
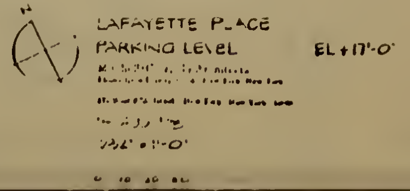


Figure B.3: LAFAYETTE PLACE - Plan at Parking Level-2



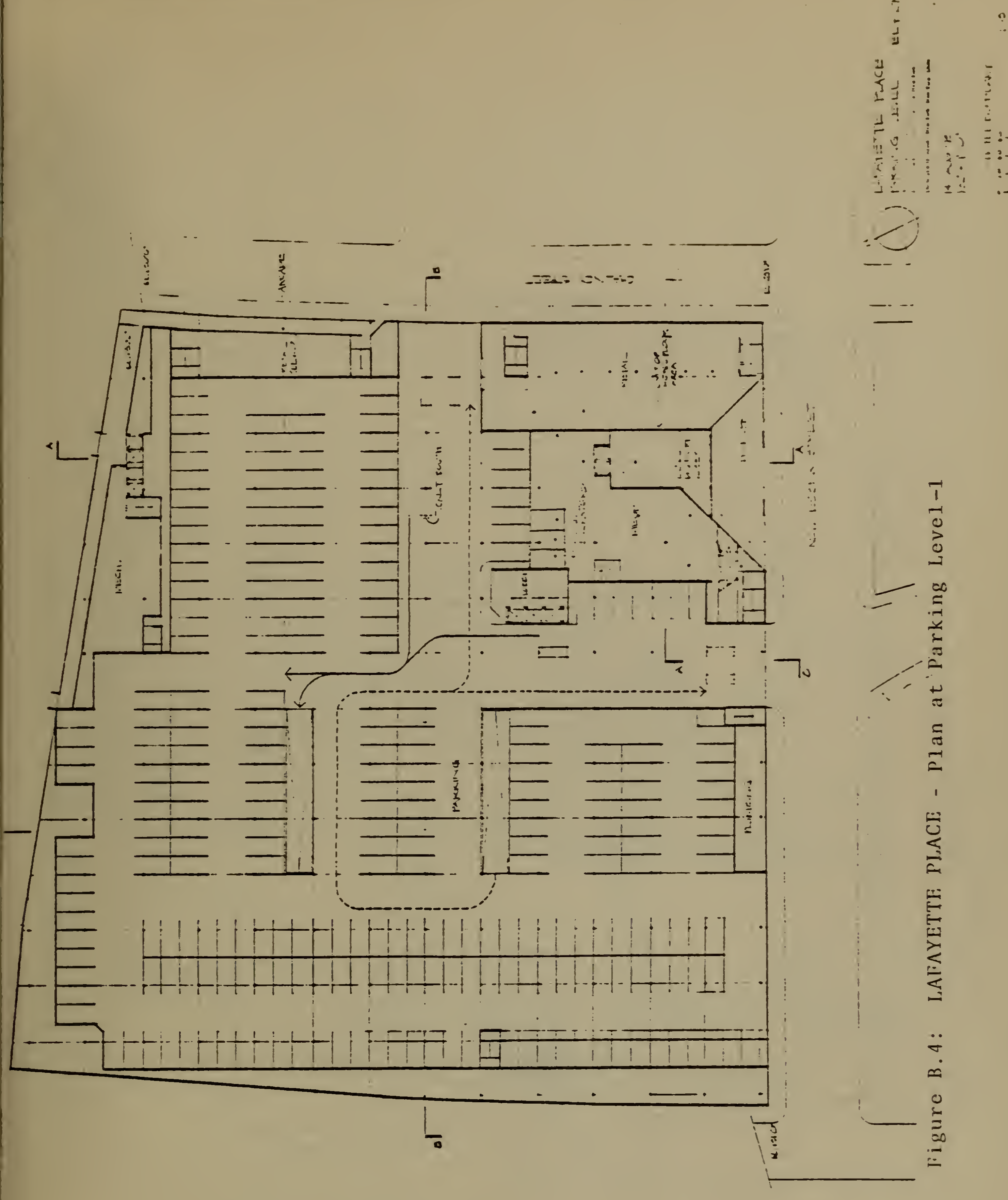


Figure B.4: LAFAYETTE PLACE - Plan at Parking Level-1

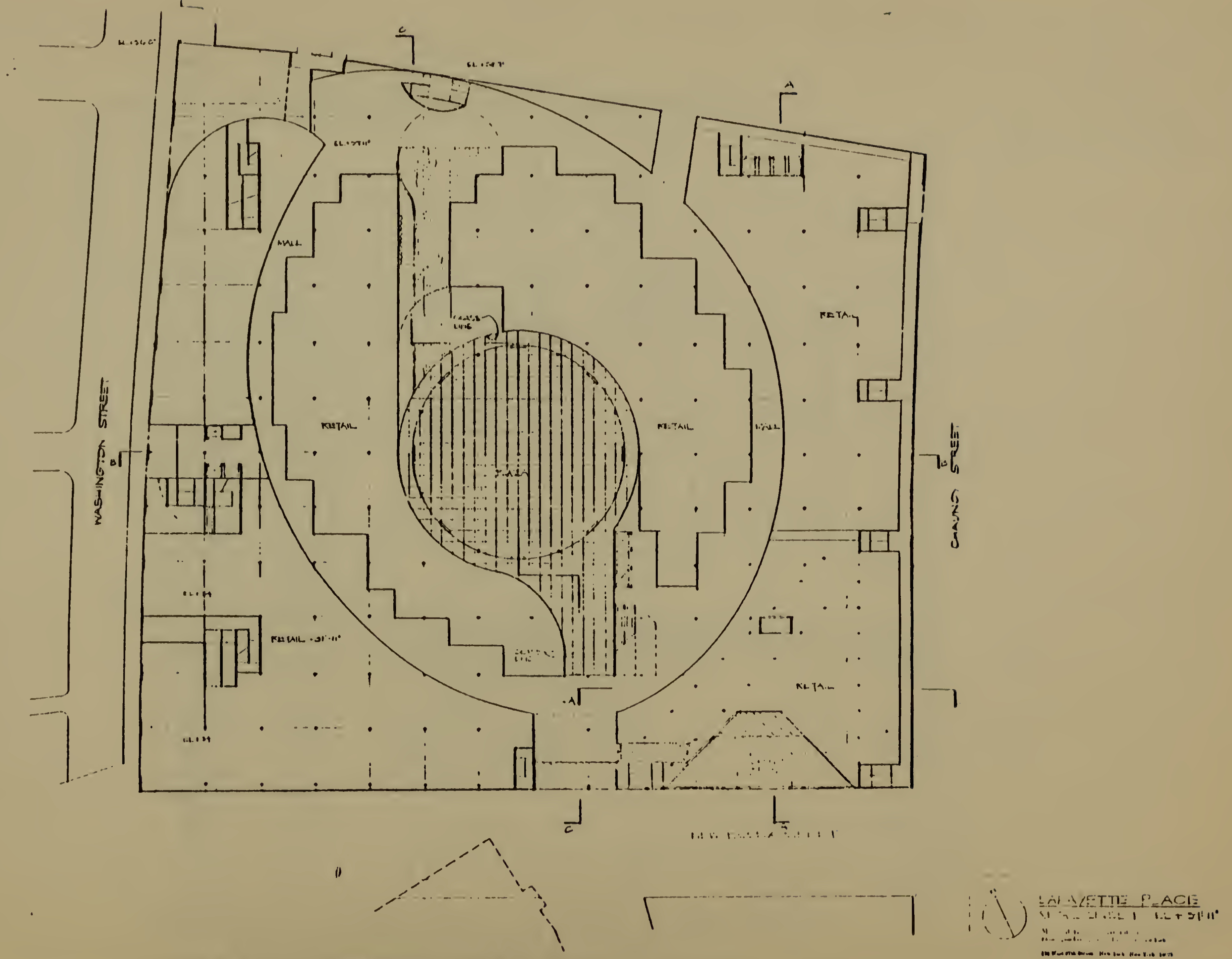


Figure B.5: LAFAYETTE PLACE - Plan at Level 1

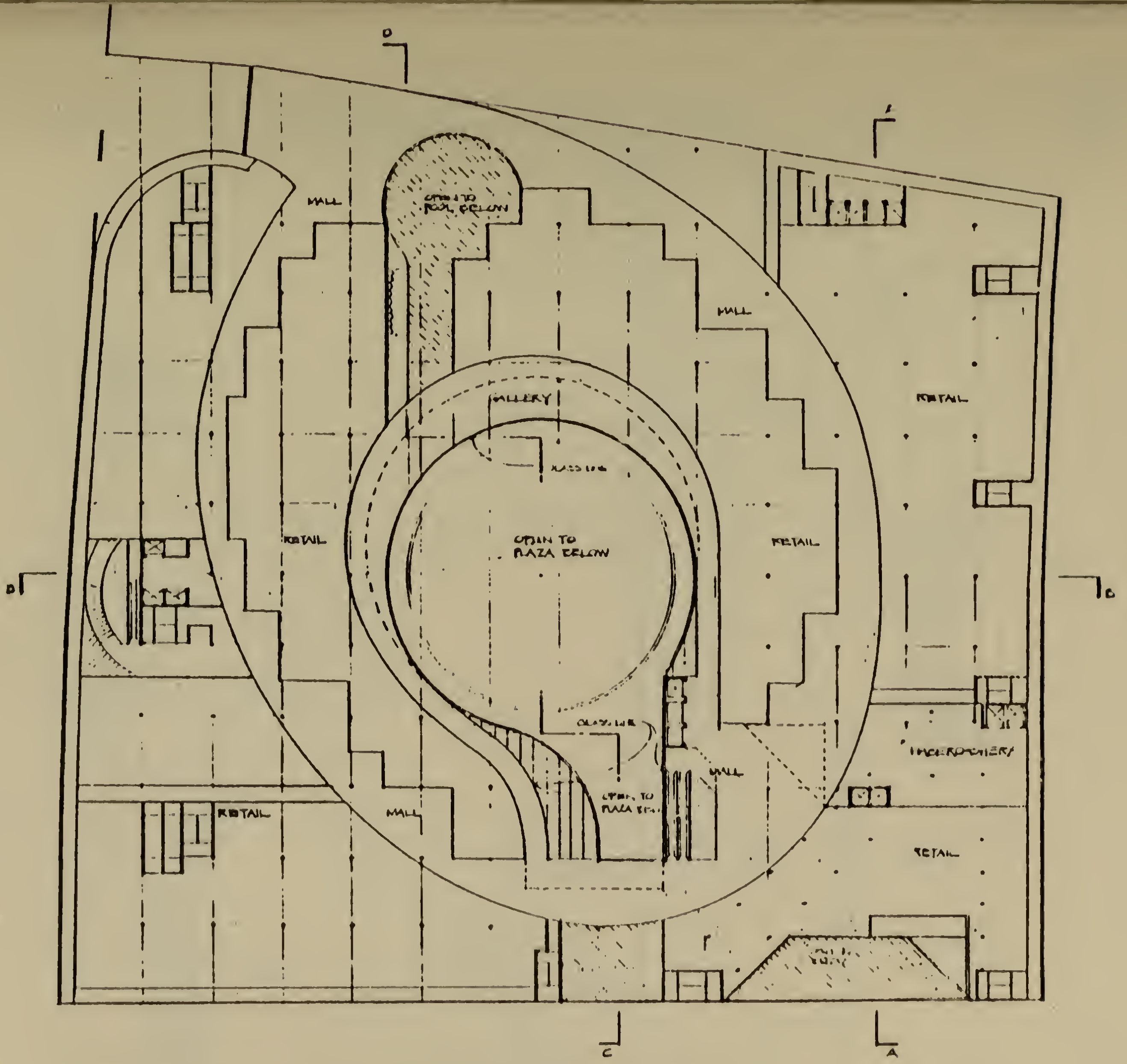
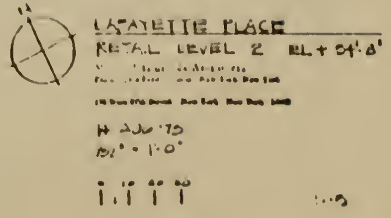


Figure B.6: LAFAYETTE PLACE - Plan at Level 2



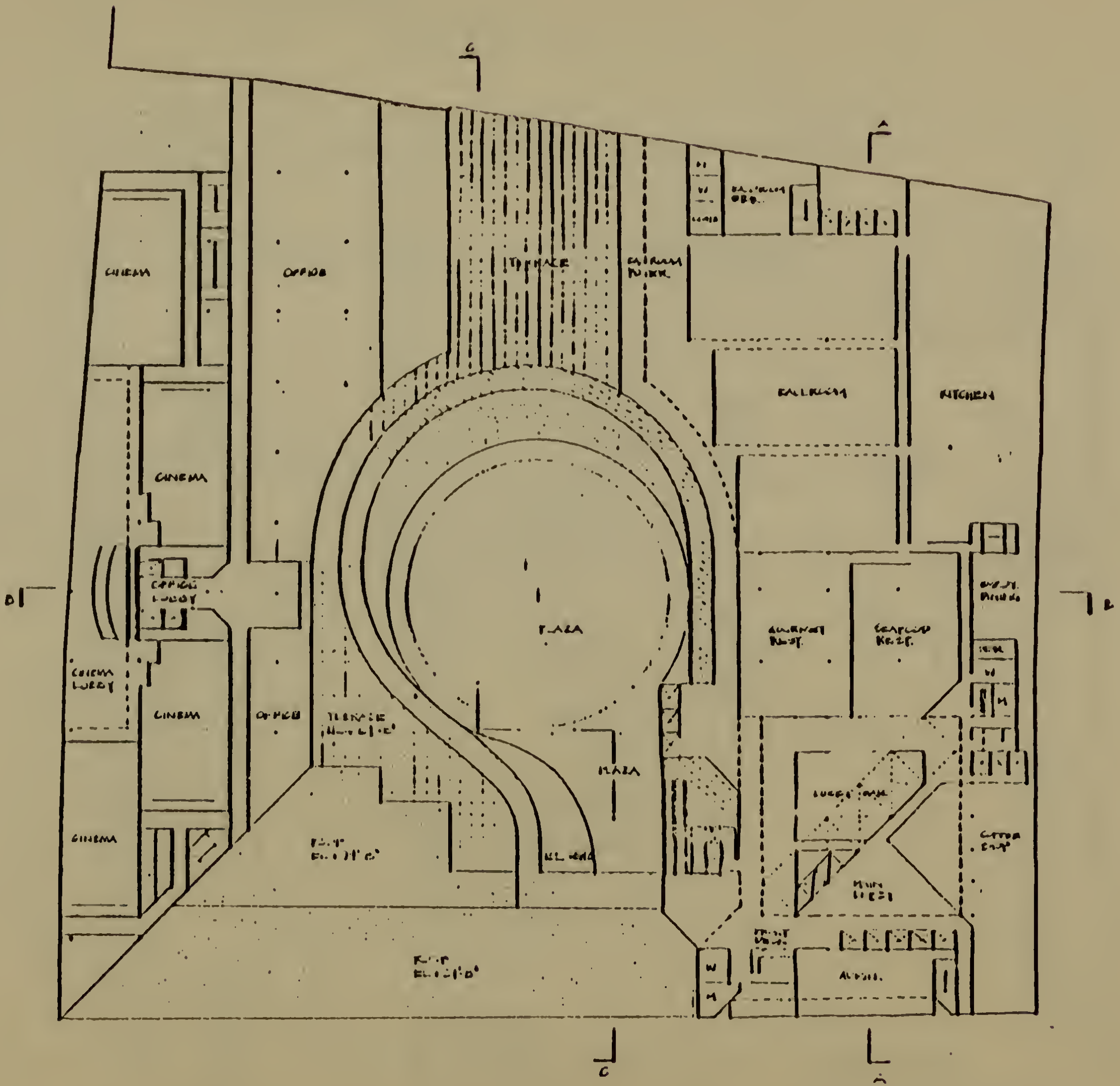


Figure B.7: LAFAYETTE PLACE - Plan at Level 3

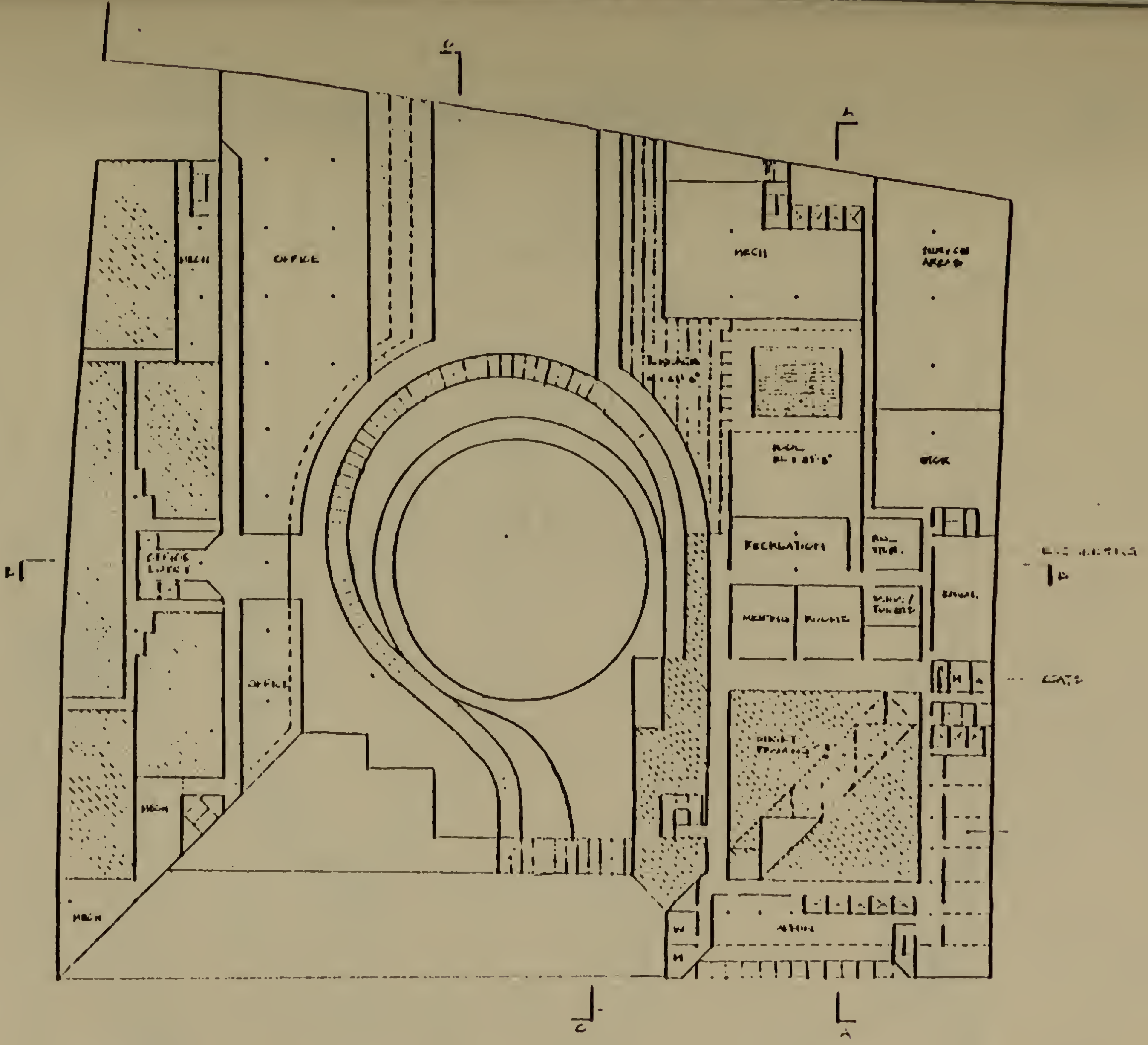


Figure B.8: LAFAYETTE PLACE - Plan at Level 4

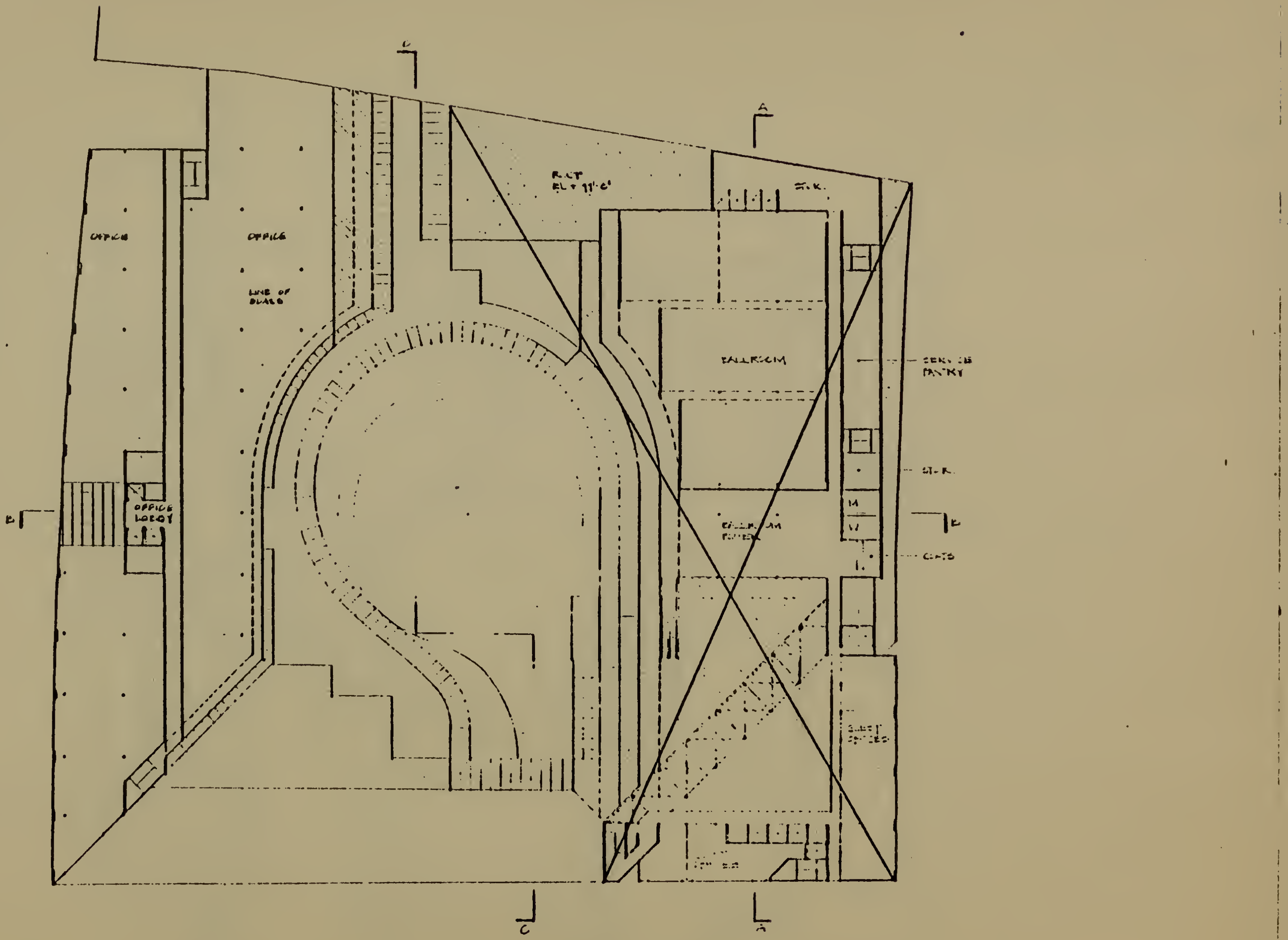


Figure B.9: LAFAYETTE PLACE: Plan at Level 5

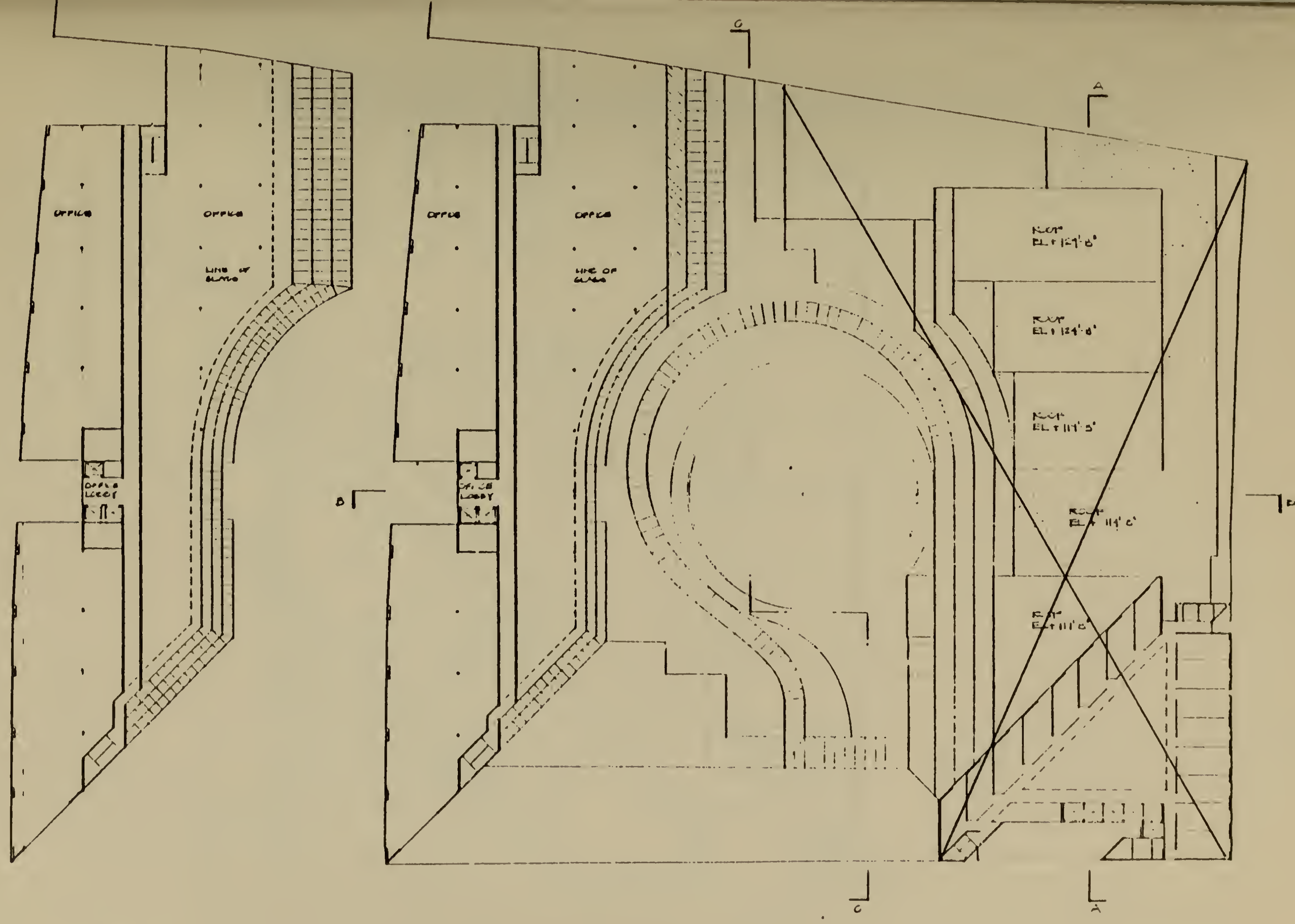


Figure B.10: LAFAYETTE PLACE - Plan at Levels 6 & 7

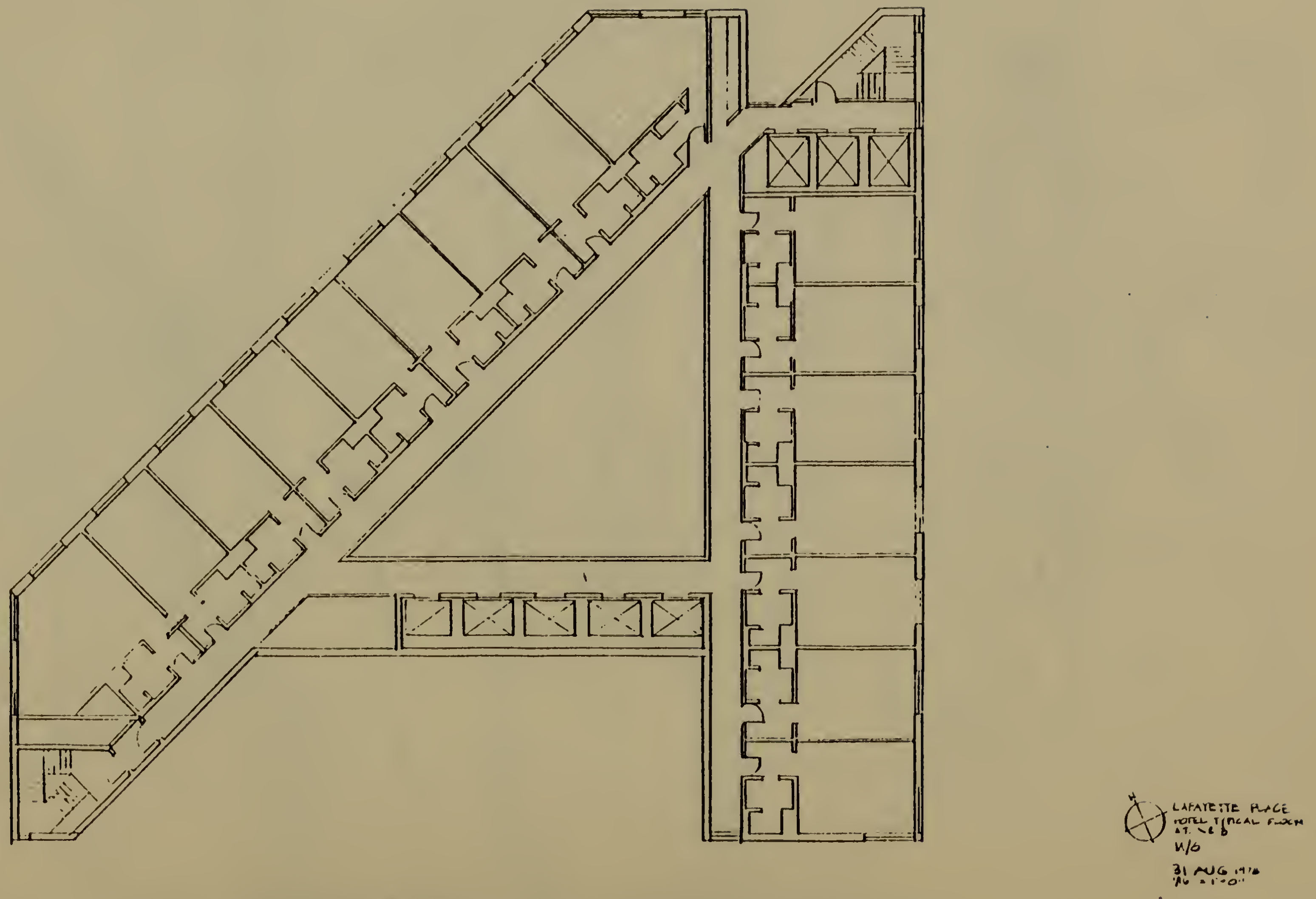


Figure B.11: LAFAYETTE PLACE - Plan of Typical Hotel Floor

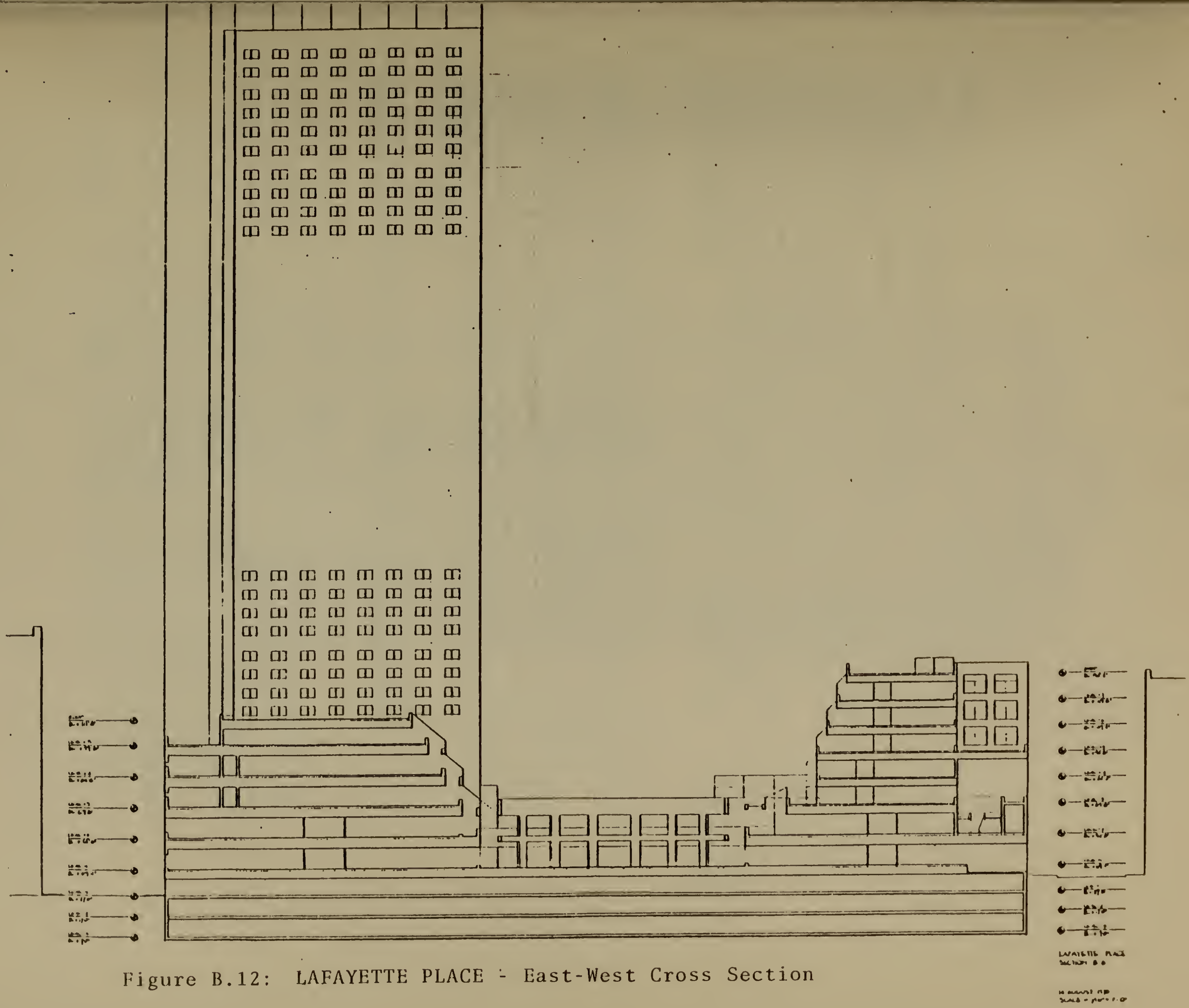


Figure B.12: LAFAYETTE PLACE - East-West Cross Section

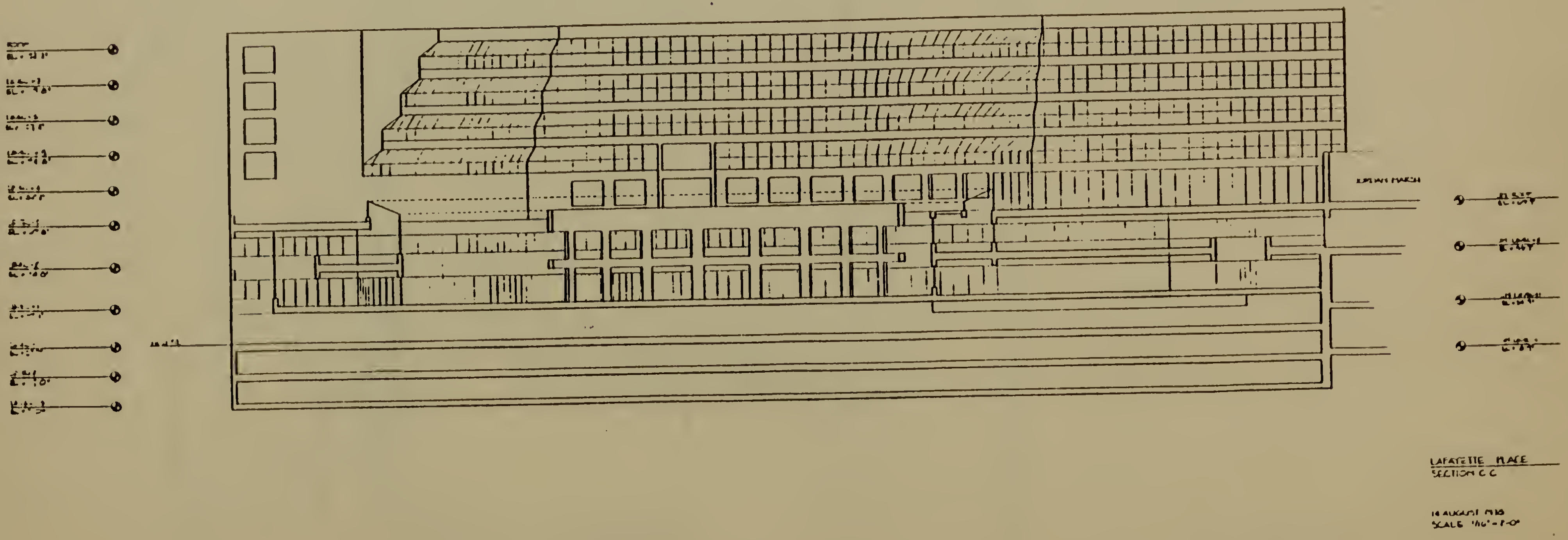


Figure B.13: LAFAYETTE PLACE - South-North Cross Section

Table B.1

Project Activity Schedule

Activity	Starting Date	Completion Date
Acquisition of remaining project property	December 1978	February 1979
Acquisition of leasehold interest in Hayward Place garage	December 1978	January 1979
Demolition and site clearance	January 1979	April 1979
Design for new garage construction	November 1978	March 1979
Construction of new garage	June 1979	August 1980
Project improvements construction	May 1979	July 1981
New Essex Street construction	February 1979	June 1979
Developer support system construction	June 1980	August 1980
Retail construction	August 1980	August 1982
Hotel construction	August 1980	August 1982

A revised summary of the total project funding program is indicated on Table B.2. This table includes updated project cost figures as well as revisions in the source of funds for the public investment portion of the development. It is currently proposed to apply the $8,000,000 Urban Development Action Grant (UDAG) funds entirely for the garage portion of the project, including acquisition of the underground garage site, acquisition of the leasehold interest in the Hayward Place garage, retirement of HUD notes on the Bedford-West urban renewal parcel, demolition of the Jordan Marsh Annex building, and partial construction of the garage itself.

The planned revisions to the Lafayette Place project will result in the following environmental impacts (separately and cumulatively):

1. Land Use and Physical Characteristics of the Area

The proposed office use will be compatible with the existing and proposed land use and character of the surrounding area as well as with the retail commercial/hotel use of the project area. Office use is an integral use in the Central Business District and within the retail core occupies the upper floors of many of the multi-storied commercial structures. Several office buildings also are located in the environs of the project site, and in addition the State Transportation (office) Building is planned for construction in the nearby Park Plaza Renewal Area and a site adjacent to Lafayette Place is under consideration for a new Federal Office Building.

Table B.2

LAFAYETTE PLACE PROJECT

Source of Funds

Private Investment (Sefrius/Mondev)

1.	Air rights acquisition	$ 3,650,000	
2.	Retail center construction	27,000,000	
3.	Hotel construction	38,000,000	
4.	Office construction	10,000,000	
5.	Support system construction	3,000,000	
			$ 81,650,000

Public Investment (City of Boston/BRA)

UDAG Funds

1.	Property acquisition	$ 4,500,000	
2.	Acquisition of leasehold interest in Hayward Place garage	400,000	
3.	HUD note retirement (Bedford-West)	1,200,000	
4.	Demolition (Jordan Marsh Annex)	700,000	
5.	Garage construction	1,200,000	
			$ 8,000,000

Bond Financing

1.	Land acquisition	$ 1,500,000	
2.	Construction of underground garage	15,300,000	
3.	Demolition of Hayward Place garage	200,000	
4.	New Essex Street construction	2,500,000	
5.	Street widenings	1,700,000	
6.	Plazas, malls, kiosks, etc.	4,500,000	
			$ 25,700,000
	Total Private and Public Investment		$115,350,000

There will be no conflict with the Boston Zoning Code, since the existing zoning for the site (B-10) allows for office use. The addition of 100,000 square feet of building area will increase the floor area ratio (FAR) of the project from 4.8 to 5.2, which is still considerably below the permitted FAR of 10 and is within the general density of the surrounding area (FAR=4-7). The addition of office space also is consistent with the Bedford-West Urban Renewal Plan (Appendix B of the Draft EIS), which allows office as a permitted use for the renewal parcel included within the development site.

The major impact on the environs, including Chinatown, will be increased activity generated by office use. Based on the current BRA Research Department estimate of 200 square feet (net) per office worker, the proposed office development will add an estimated 425 persons to the project area on a daily basis, with an additional 105 business visitors (25% of total workers). These employees and visitors could be expected to generate additional vehicular traffic on the streets in the vicinity of the project area (for details, see "Transportation Network" below), resulting in attendant changes in air quality and noise impacts.

2. Land Conditions and Natural Resources

The proposed addition of the office space will have no additional effect on the existing land conditions or natural resources. In particular, the existing subsurface geologic and soil conditions are such that the added load of the office addition should not present any construction problems.

3. Transportation Network

The additional office space is not expected to result in any significant impact on the area's transportation network or facilities. The proposed office use will add an estimated 527 person-trips (two-way) per day to the project area (see Attachment B.1). Based on available studies,[1] the modal split for the 425 employees and 105 visitors is calculated as follows:

Auto: 0.3 @ 1.3 persons/auto
Rapid Transit: 0.5
Bus/Train: 0.1
Walk/Other: 0.1

It is also estimated that a majority of these trips (75% for office employees) would be made during the morning (8-9) and evening (5-6) rush hours, when the greatest demand is being placed on

---

[1] Barton-Aschman Associates, Inc., Site Anaylsis - Lafayette Place, Boston, Massachusetts, prepared for SEFRIUS, Developers, Washington, D.C., July 1974; Wilbur Smith and Associates, An Access Oriented Parking Strategy for the Boston Metropolitan Area, Boston, 1974.

Table B.3
(Table II.A.9 Revised)

Peak Hour Traffic Generated by the Proposed Lafayette Place Development

Time	Land-Use Retail	Hotel	Office	Total
Outbound PM Peak (5:00 PM to 6:00 PM)				
Inbound	335	30	5	370
Outbound	475	55	60	590
TOTAL	810	85	65	960
Outbound Shopping Peak (9:00 PM to 10:00 PM)				
Inbound	85	15	0	100
Outbound	640	30	5	675
TOTAL	725	45	5	775
Inbound AM Peak (7:00 AM to 8:00 AM)				
Inbound	85	30	70	185
Outbound	45	15	0	60
TOTAL	130	45	70	245
Inbound Shopping Peak (7:00 PM to 8:00 PM)				
Inbound	585	110	5	700
Outbound	335	110	5	450
TOTAL	920	220	10	1,150

Source: Appendix F (Draft EIS) and Attachment B.1

Table B.4 (Table II.A.10 Revised)

Site Generated Traffic Volumes by Direction of Approach/Exit - Peak-Hour Periods

Direction of Approach/Exit	5:00-6:00 PM		9:00-10:00 PM		7:00-8:00 AM		7:00-8:00 PM	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
East - Summer Street	10	10	5	15	5	0	15	10
East - Purchase Street Off-Ramp	60	--	15	--	30	--	110	--
East - High Street	50	--	10	--	25	--	90	--
East - Atlantic Avenue On-Ramp	--	170	--	195	--	20	--	130
West - Boylston-Essex	75	--	20	--	35	--	140	--
West - Stuart/Kneeland	35	60	10	70	20	5	70	45
West - Tremont/Boylston	--	120	--	135	--	10	--	90
North - Tremont Street	25	--	10	--	15	--	50	--
North - Chauncy/Arch	--	40	--	45	--	5	--	30
South - Washington Street	15	25	5	25	5	0	30	20
South - Lincoln Street Off-Ramp	80	--	20	--	40	--	155	--
South - South Street Off-Ramp	20	--	5	--	10	--	40	--
South - Surface Artery On-Ramp	--	165	--	190	--	20	--	125
TOTAL	370	590	100	675	185	60	700	450

the city's transportation network. Business visitors would be dispersed throughout the day and would have no noticeable impact on the system.

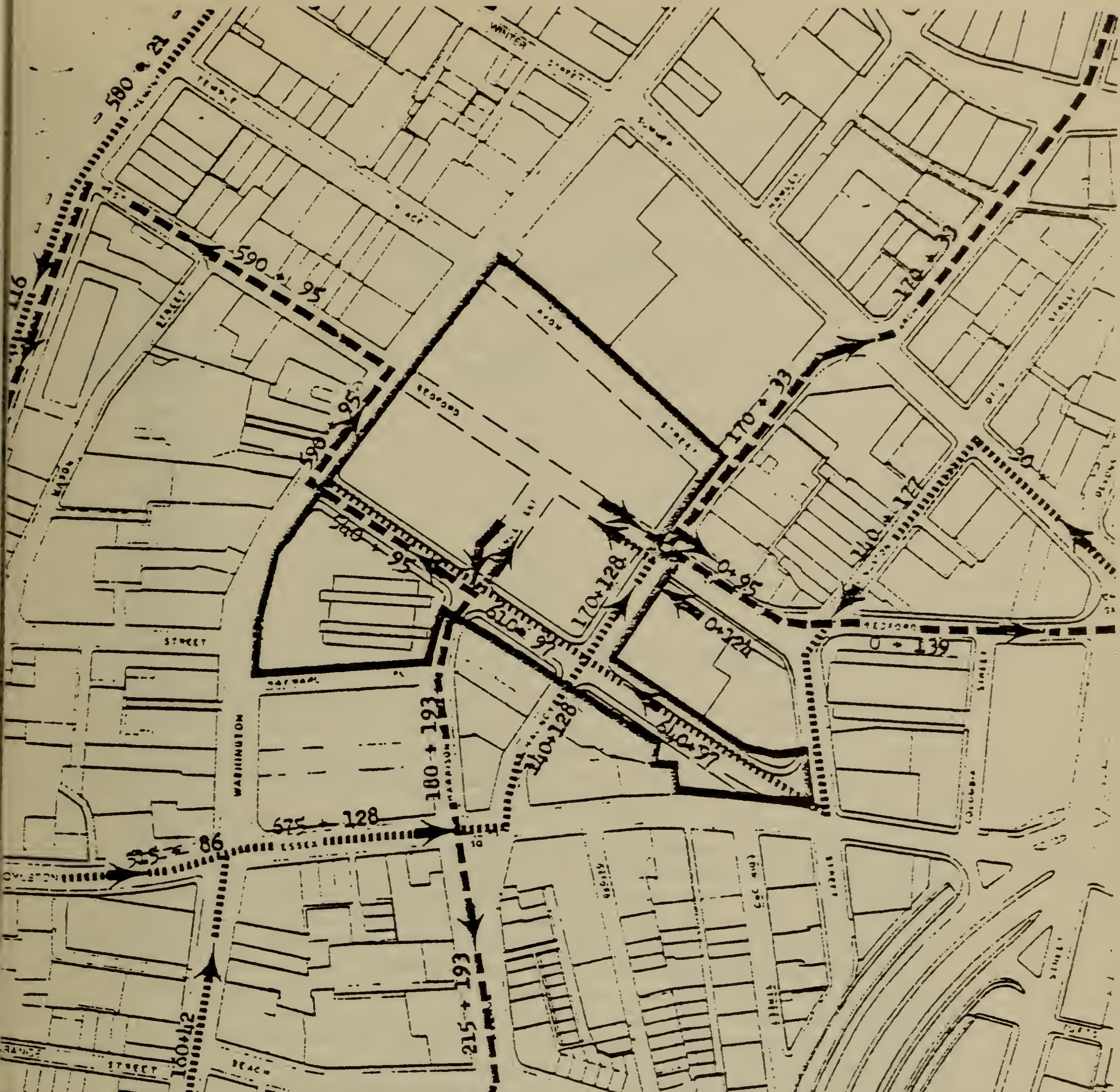
Attachment B.1 and Tables B.3 and B.4 (revised Tables II.A.9 and II.A.10 of the Draft EIS) indicate the additional auto traffic generation and distribution as a result of the proposed office development. As noted above, the major impact will occur during the A.M. and P.M. peak hour periods, when an additional 70 (morning) and 65 (evening) autos would be added to the downtown vehicular stream. Although this increase is minimal, it will take place at the commuter hours, when traffic entering and exiting from the core area is the heaviest, and existing conditions of congestion would be further exacerbated to a minor degree. However, the BRA Transportation Planning Department analysis of the Lafayette Place project did not indicate that any capacity problems would result from the project as originally proposed, as a direct result of the project development, and the additional 65-70 vehicles during the peak hours are not expected to alter this conclusion.

Peak parking demand from the office development is estimated at 98 spaces (see Attachment B.1). Assuming that 100% of these spaces would be located in the Lafayette Place garage (a highly unlikely worst-case situation, since the rate structure of the garage will be such as to favor short-term shopper parking and to discourage all-day parking), the revised impact on adjacent street segments is as follows:

Table B.5
Street Segment Analysis

Street Segment	TTIP Volume	Garage Volume	Garage Increase
New Street, from Kingston to Harrison	610	97	15.9%
Summer Street, from Purchase to South	200	93	46.5%
Harrison Ave. Ext., from New to Hayward	250	193	77.2%
Summer Street, from South to Devonshire	260	177	68.1%
Chauncy Street, from Essex to Bedford	170	128	75.3%
Kingston Street, from Summer to Essex	140	97	69.2%
Bedford Street, from Chauncy to Summer	0	139	-
Bedford Street, from Kingston to Chauncy	0	95	-

In the P.M. peak hour, the Lafayette Place garage is projected to generate 460 outbound and 305 inbound vehicular trips (assuming 100% office use). As the above table indicates, the greatest increase (10%) from the office space addition would occur on Harrison Avenue Extension. According to a revised intersection analaysis (Table B.6), the largest increase (approximately 2%) over the original project proposal would occur at Phillips Square and at Washington and the new arterial street; the garage contribution to the remaining intersections would be increased by approximately 1% or less.



▬ ▬ ➔ OUTBOUND ROUTE

┅┅┅➔ INBOUND ROUTE

P.M. PEAK TRAFFIC VOLUMES

TTIP Volume + Lafayette Place Garage Volume
100 + 10

0 200 400 FEET

LAFAYETTE PLACE

P.M. PEAK (4:30-5:30)
LAFAYETTE PLACE GARAGE
AND TTIP VOLUMES
JUNE 1,1978
Figure B.14 (II.A.23 Rev.)
BOSTON REDEVELOPMENT AUTHORITY

Table B.6
(Table II.A.12 Revised)

Intersection Analysis - TTIP and Lafayette Place Generated Traffic

Intersection	TTIP Volume	Garage Volume	Total Volume	Garage Contribution
Washington-Milk	1,075	33	1,108	3.0%*
Arch-Franklin	760	33	793	4.2%
Summer-High	565	316	881	35.9%
Chauncy-New	780*	225*	1,005*	22.4%*
Washington-New	590	95	685	13.9%
Kingston-Bedford	140	316	456	69.3%
Essex-New	1,140	97	1,317	7.4%*
Phillips Square	855	321	1,176	27.3%
Harrison-Kneeland	2,415	193	2,608	7.4%

* Corrected figures; original table in error.

In reality, however, it could be expected that the majority of the employee auto drivers would park at other, nearby, commuter parking facilities where all-day rates would be considerably cheaper, and therefore there would not be a concentration of additional vehicular traffic at the Lafayette Place garage.

The Lafayette Place parking facilities, even with 100% use by office parking demand, would be able to accommodate adequately the additional 98 space demand (78 spaces for employees and 20 spaces for visitors). Since the normal peak period parking requirement of the Lafayette Place project without the office space was estimated at 1,285 spaces, the additional office demand would increase the requirement to 1,383 spaces, still below the total proposed space availability of 1,500. In addition, since these spaces would be in demand almost entirely during the weekday only, the office requirements would not adversely affect the peak holiday shopping period demands, which normally would occur during office building off-hours. Furthermore, no entrance/exit problems are foreseen, due to the excess capacity of the garage entrance/exit points and the fact that the majority of the office related traffic would enter and leave during the commuter rush hours when retail/hotel usage would be minimal.

In the short-term (construction) period, demolition of the Hayward Place garage would add an estimated average of 27 trucks per day to haul away the demolition debris. If the demolition of the garage occurs early in the project, during maximum truck generation activity, total truck activity could increase by some 20% to 161 trucks per day. The impact of this additional traffic on the local street system can be minimized through careful scheduling of arrivals and departures to avoid peak traffic periods or by scheduling the demolition of the garage at a time when maximum truck generation from the remainder of the project is not anticipated. Moreover, adequate open space exists around the garage for the storing of demolition equipment and queuing of trucks so as not to impact adversely the surrounding streets.

With respect to public transportation facilities, it is estimated that 50% of the office employees would utilize the rapid transit system and that 75% of these trips (160 trips) would occur during the morning and evening rush hours each. Based on the Barton-Aschman trip generation analysis, the highest number of riders would be added to the Red Line (50 persons) and the Orange Line (65 persons). While this number is insignificant, in relation to the total ridership at peak hours, some of the transit lines currently are operating above capacity at peak periods and any additional ridership would exacerbate this problem. As noted in the Draft EIS, however, system improvements are underway or in planning to eliminate this situation. (See also response to MBTA comments in Part D.) Business visitors would be dispersed throughout the day and therefore would have no impact on the transit system.

The increased pedestrian volumes generated by the office space are not expected to have any adverse impacts, since the public and private pedestrian circulation systems, both within the project and external to it, will be designed to accommodate anticipated volumes.

4. Infrastructure and Energy Resources

The addition of 425 employees and 105 visitors generated by the office space would increase average water demand by 19,625 gallons per day.[1] Total demand of the Lafayette Place project therefore, would increase by 5% to 414,390 gal./day average, or a 0.28% increase in total City demand (0.01% increase from the original project). Average daily sewage demand would also increase by 19,625 gallons, an insignificant impact on the area's sanitary sewage system.

Demolition of the Hayward Place garage would add an estimated 20,620 cubic yards (43,302 tons) to the demolition debris generated by the Lafayette Place project,[2] for a total of 79,690 cubic yards (167,349 tons). This sum represents a 35% increase in project generated demolition debris which will require disposal at an approved disposal site. Steel beams and possibly some other building elements can be salvaged for reuse, which would reduce to some extent the impact of this additional demolition.

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[1] Based on 40 gal./capita/day for employees and 25 gal./capita/day for visitors (BRA Engineering Department)

[2] Based on demolition debris equal to 30% of total building volume (68,725 cubic yards) and a weight of 2.1 tons per cubic yard (Appendix H of the Draft EIS).

The proposed office space construction would not add to the amount of demolition or excavation debris material but would increase construction debris by an estimated 350 cu. yds. (122.5 tons)[1]. Total solid waste generated during the construction period, therefore, is estimated to increase by 10.5% to 220,210 cu. yds. (532,593.5 tons).

Energy consumption of the added office space is estimated by Boston Edison Company at 400KW electrical demand and 2,500 lbs./hour steam demand (assuming heating and air conditioning are supplied by Boston Edison steam).[2] Total electrical demand of the project, therefore, would increase to 2,450KW, an increase of 0.44% to the total load for downtown Boston. Total hourly steam demand would increase to 35,500 lbs. or an increase of 1.7% over existing downtown maximum hourly demand. Existing and proposed Edison facilities will be adequate to meet this minimal additional demand.

5. Air Quality

The demolition of the Hayward Place garage could add an estimated maximum of 145 tons of particulate matter to the ambient air during the three-month demolition period (or an average of 1.6 tons per day).[3] This amount would be added to the 1.8 tons per day maximum anticipated to be generated during the first year of development, when all proposed demolition and land clearance and excavation activities are scheduled to be undertaken. Since existing particulate levels are high in the Boston area and violations of standards have been recorded, this increase would represent a significant adverse impact unless proper controls and available mitigation measures (such as extensive or continuous wetting of the demolition site) are implemented, which can reduce dust generation by as much as 50% to 80%. The addition of the 100,000 sq.ft. of office space to the Lafayette Place project, however, will have only minimal short-term impacts on particulate levels from the construction process itself. In addition, gaseous emissions (primarily carbon monoxide, hydrocarbons, and nitrogen oxides) will increase slightly during the construction period due to the greater number of trucks necessary for removal of the demolition debris and additional construction and to the longer use of certain demolition and construction equipment.

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[1] Based on 70 cu. yds./20,000 sq. ft. of building area and 0.35 tons/cu.yd. (Appendix H of the Draft EIS).

[2] Although project plans for heating are still being developed, on-site fuel burning currently is not being contemplated for this project.

[3] Based on 6.7 lbs of dust per ton of demolition waste; total demolition waste of the Hayward Place garage is estimated at 43,302 tons.

In the long-term, no significant additional impact on air quality is expected to result from additional building mechanical equipment. Rather, the increased height of the building will permit a higher elevation for the venting of exhausts, which could slightly improve the opportunity for the mixing of pollutants and for a reduction of ground level impacts from building generated emissions. Similarly, garage ventilation emissions from the additional parking demand of the office space should increase very minimally, due to the relatively minor increase of this demand. No changes would occur in the garage emission rates given in Table II.A.21 of the Draft EIS or in the CO level impact in Table II.A.22, since these calculations were based on worst-case assumptions and were not directly related to actual anticipated garage usage. Actual CO concentrations within the garage are expected to be considerably less than the maxima indicated in Table II.A.21.

With respect to traffic-related air quality impacts, the additional traffic generated by the office space (assuming 100% usage of the Lafayette Place garage) generally would result in only minor increases in carbon monoxide concentrations at certain of the modelled intersection receptor locations. No violations of the 1-hour standard and no new violations of the 8-hour standard would result, although anticipated violations at a few of the intersections would be slightly exacerbated. The most significant increases would occur on Harrison Avenue at Kneeland Street (Receptor Location I3), where the 1-hour concentration would rise by 1.9 ppm and the 8-hour concentration by 1.0 ppm. For the most part, 1-hour concentrations would increase between 0.1 and 1.0 ppm (average, 0.46 ppm) and the 8-hour concentration by 0.1 to 0.5 ppm (average, 0.24 ppm). Of the 33 receptor locations modelled, no increases would occur at 22 of the sites. A summary of the additional pollutant concentrations as a result of the office space generated traffic is presented on B.7 (Table II.A.20, Revised).[1]

Project-related VMT (vehicle miles of travel) per year is expected to increase by 637,000 (7.5% over the original project) as a result of the office space addition. Net change in VMT, therefore, is estimated to increase by +9,091,445, or 0.057% of the Metropolitan Boston AQCR VMT (an increase of 0.004% over the original project). A VMT analysis of the office space addition is presented in Attachment B.2. Mitigation measures, such as encouraging employees to use mass transit facilities (through the MBTA Pass Program) or car pools can help to reduce the usage of parking spaces in the project vicinity and thus the regional VMT.

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[1] Data respecting the air quality impact of the additional traffic generation was furnished by Bolt Beranek and Newman, Inc.

Table B.7
(Table II.A.20, Revised)

PREDICTED (1982) MAXIMUM 1-HR AND 8-HR CARBON MONOXIDE CONCENTRATIONS AT SELECTED RECEPTOR LOCATIONS (with inclusion of office space to Lafayette Place project)[1]

Intersection	Receptor No. and location*	Percent (%) Garage-Induced Traffic	Concentrations in ppm	
			1-hr†	8-hr**
Chauncy and New Sts.	A1 - North approach on Chauncy St.	42.0	6.9	3.9
	A2 - East approach on New St.	21.6	24.8	12.6
	A3 - South approach on Chauncy St.	46.8 (47.8)	26.5 (27.0)	13.4(13.7)
	A4 - New St. west from intersection	22.5	9.8	5.3
Chauncy and Bedford Sts.	B1 - By garage exit/entrance	100.0	10.0	5.5
	B2 - North approach on Chauncy St.	14.1(16.2)	6.4 (6.6)	3.7(3.8)
	B3 - On Bedford	100.0	5.6 (6.3)	3.3(3.7)
	B4 - South approach on Chauncy St.	42.0 (43.0)	12.9 (13.1)	6.8(6.9)
New St. and Harrison Ave.	C1 - By garage exit/entrance	100.0	12.7	6.8
	C2 - East approach on New St.	22.5	15.5	8.1
	C3 - On Harrison, south of intersection	40.2	6.0	3.5
	C4 - On New St. going west	12.9	8.6	4.8

*See Fig. B.14

†1-hr standard is 35 ppm.

**8-hr standard is 9 ppm.

[1] Numbers in parentheses indicate revised results due to traffic generated by addition of 100,000 sq. ft. of office space to Lafayette Place project; assumes worst-case of 100% usage of Lafayette Place garage.

Table B.7 (cont'd)
(Table II.A.20, Revised)

Intersection	Receptor No. and Location*	Percent (%) Garage-Induced Traffic	Concentrations in ppm 1-hr†	Concentrations in ppm 8-hr**
Washington and New Sts.	D1 - On Washington, north of intersection	11.9 (13.8)	8.2 (8.4)	4.5(4.6)
	D2 - South approach on Washington	0	5.9	3.4
	D3 - East approach on New St.	12.9 (15.0)	25.4 (26.0)	12.9(13.2)
Bedford and Kingston Sts.	F1 - North approach on Kingston St.	20.2	19.2	10.0
	F2 - On Bedford, going east	100.0	5.4 (6.1)	3.2(3.6)
	F3 - On Kingston St., going south	20.2	9.2	5.0
	F4 - West approach on Bedford St.	20.2	8.3	4.6
New and Essex Sts.	G1 - North approach on Kingston St.	20.2	24.0	12.1
	G2 - On Essex, going east	0	8.2	4.6
	G3 - On Kingston, going south	0	5.3	3.2
	G4 - West approach on Essex	0	15.2	7.9
	G5 - going west on New St.	21.7	9.5	5.2

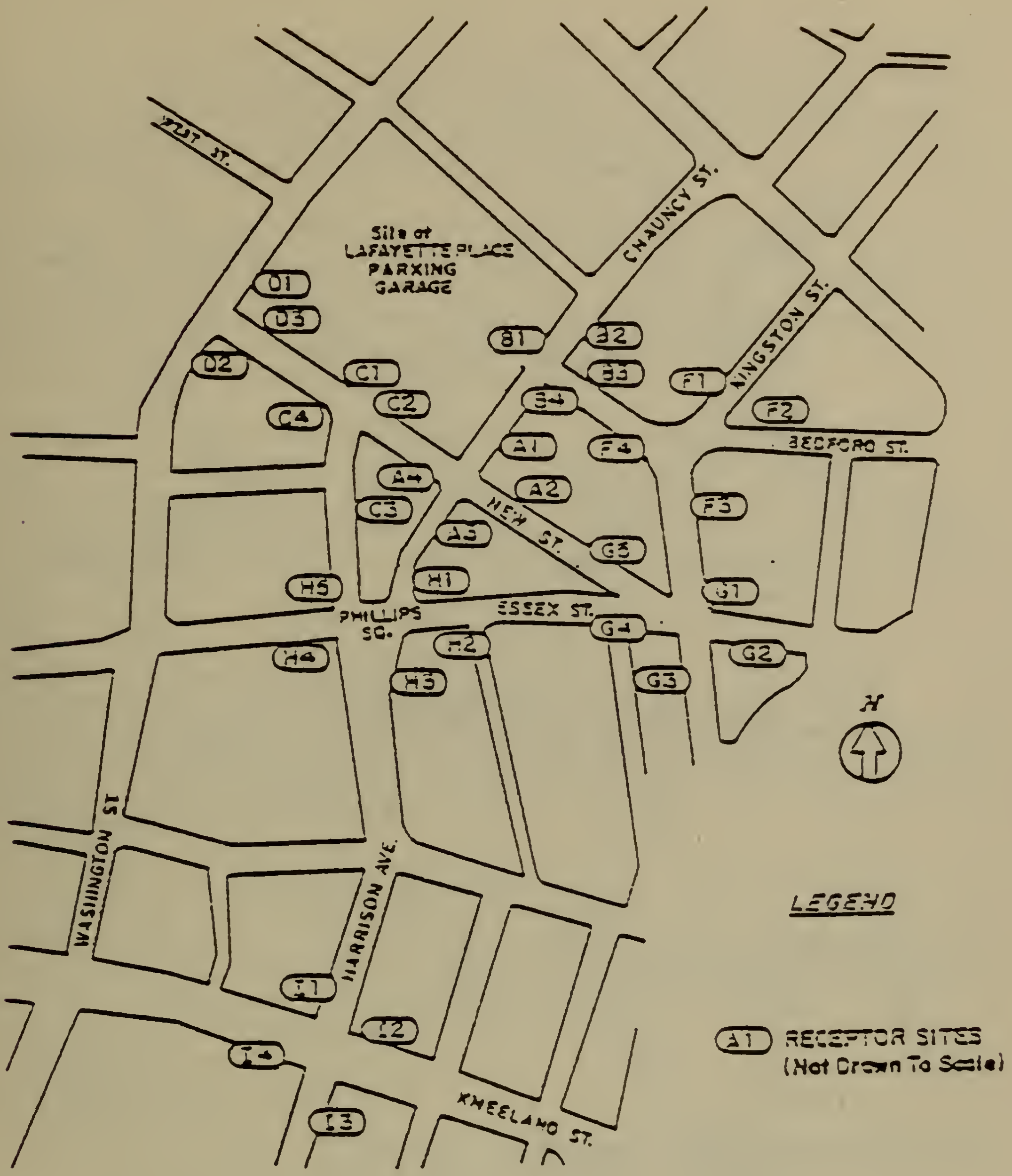
*See Fig. **B.14**
†1-hr standard is 35 ppm.
**8-hr standard is 9 ppm.

Table B.7 (cont'd)
(Table II.A.20, Revised)

Intersection	Receptor No. and Location*	Percent (%) Garage-Induced Traffic	Concentrations in ppm 1-hr†	8-hr**
At Phillips Square	H1 - Going north on Chauncy St.	46.8	6.5	3.7
	H2 - Going east on Essex St.	0	8.2	4.6
	H3 - Going south on Harrison Ave.	40.2 (43.6)	6.2 (6.6)	3.6 (3.8)
	H4 - West approach on Essex St.	15.4 (15.9)	22.5 (22.6)	11.5 (11.6
	H5 - North approach on Harrison St.	40.2	27.8	14.2
Harrison Ave. and Kneeland St.	I1 - North approach on Harrison St.	43.3 (46.7)	15.6 (16.6)	8.1 (8.6)
	I2 - East approach on Kneeland St.	4.7	20.8	13.9
	I3 - Going south on Harrison Ave.	0 (8.3)	23.1 (25.0)	11.7 (12.7
	I4 - West approach on Kneeland St.	2.6	33.7	16.2

*See Fig. B.14
†1-hr standard is 35 ppm.
**8-hr standard is 9 ppm.

Source: Bolt, Beranek & Newman, Inc., Air Quality Impact Analysis of the Proposed Lafayette Place Parking Garage, June 1978, Table 2. Revisions based on additional analysis by BB&N.



Source: Bolt, Beranek & Newman, Inc., Air Quality Impact Analysis of the Proposed Lafayette Place Parking Garage, June 1978, Figure 2

Figure B.15: RECEPTOR SITES - LAFAYETTE PLACE AIR QUALITY IMPACT ANALYSIS

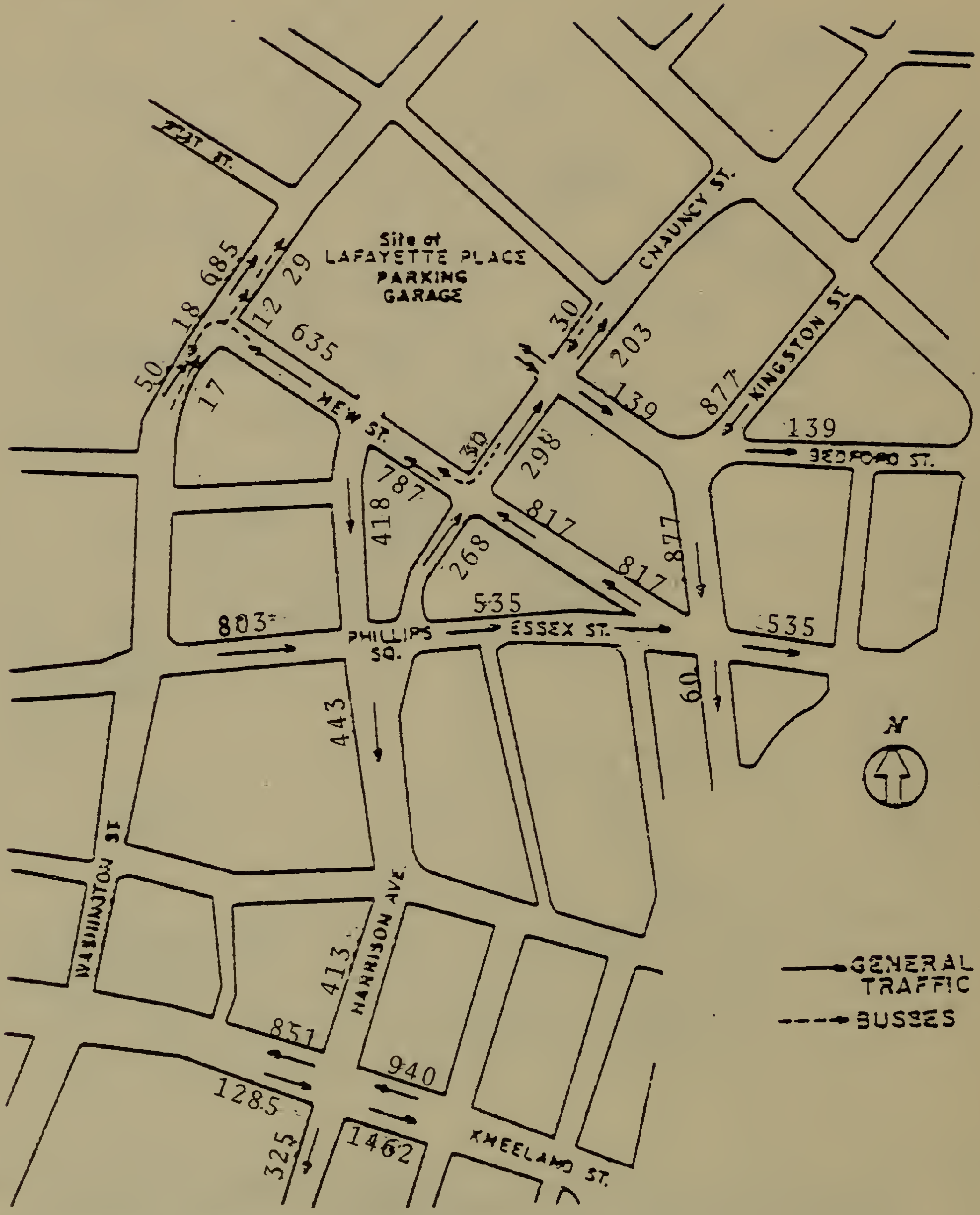


FIG. B.16: PROJECTED PEAK HOUR TRAFFIC VOLUMES AND TRAFFIC FLOW IN THE VICINITY OF THE LAFAYETTE PLACE PARKING GARAGE. (with addition of traffic generated by addition of 100,000 sq. ft. of office space to Lafayette Place project; assumes worst-case of 100% usage of Lafayette Place garage).

6. Noise Levels

The additional demolition and construction activities would not add any perceptible increase to construction period noise levels, as the demolition of the Hayward Place garage and the office construction would occur concurrently with on-going activities and the resulting individual noise sources would tend to blend together.

Additional building mechanical systems would be necessary to serve the office structure, but generally they would be located some seven stories above street level. Proper design and mechanical controls, as well as the normal decay of sound pressure levels with distance, should assure that no adverse impacts are likely to result from the additional equipment.

The proposed office space is expected to add only minimal additional traffic to the adjacent streets (maximum P.M. peak hour increase is estimated at 25 vehicles on Harrison Avenue Extension, or an increase of 10%). The increased volumes are not expected to result in any perceptable changes in projected noise levels.

7. Water Quality

During demolition of the Hayward Place garage some additional pollutants and suspended solids could be added to the Boston Harbor water from surface runoff during storm conditions and from potential spillage from trucks hauling the demolition debris. Such additions would be minimal and have insignificant impact on the water quality.

Occupancy of the proposed office space would add an estimated 19,625 gallons per day of sanitary wastewater, for a project total of 414,390 gal./day. The contribution from the project to the Deer Island Sewage Treatment Plant (which has a current load of 299 MGD), therefore, would increase from 0.13% to 0.14%. This increase would be insignficant.

8. Wind and Shadow Effects

A detailed discussion of the wind impacts of the proposed Lafayette Place project, including the addition of the four floors of office space, is included in Part D below.

The major shadow effect of the additional stories would be increased shadowing of the Washington Street facades opposite the project area (for further comments, see "Historic Resources" below), and increased shadowing of the interior shopping mall, resulting in less exposure of the mall to the sun. This can be considered an adverse impact during those seasons of the year when sunlight would be welcomed in the mall.

9. Community Character

A major impact of the incorporation of office space into the Lafayette Place project relates to the general office space development in downtown Boston. Office market trends in Boston have been generally governed by basic supply and demand conditions but have been more highly susceptible to changing local and national economic currents than have other markets such as retail and housing. Until 1973, almost half of the private downtown office space in Boston had been built between 1891 and 1930. These dates correspond to the period in which Boston completed its change from a mercantile to an industrial economy and experienced a doubling of its population. During the next thirty years very little office space was constructed, possibly due to a combination of economic depression, a shift in Boston's economic base, the adequacy of existing structures in terms of physical conditions, and the resultant low demand for new construction. However, from 1961 to the present, the Boston office market has experienced substantial growth and 15.5 million square feet of office space have been built. This building boom was directly related to the need for additional and newer office space, but also was influenced by Boston's property tax structure and by the advent of Chapter 121A and tax letters of agreement.

During this recent period of new construction, Boston's office market has been able to absorb the large amounts of new space. Although Class C structures (those constructed before 1960 with only essential maintenance) have suffered from the new construction, the overall vacancy rates have remained consistantly below 10% with the exception of the past two years. Table B.8 lists the average vacancy rates for all classes of Downtown Boston private office space from 1934 to the present. In April, 1977, the vacancy rate rose to 15.10%, reflecting the large addition of new or Class A space (built after 1958 or completely modernized) and the impact of economic recession on the Downtown economy that occurred at that time.[1] By April, 1978, the vacancy rate dropped to 10.10%, demonstrating a downward trend that is expected to continue. The current total supply of private office space is 38 million gross square feet, of which 3.8 million square feet is surplus.

In 1979, for the first time in 14 years, there will be no office building completions in the downtown area; and since there are no immediate plans for new construction to begin, there will be no buildings completed until the early 1980's. Two major developments other than Lafayette Place which would include private office space are currently in the planning stages. These include Park

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[1] Matrullo, Michael, "The Office Industry Survey Interim Report", Boston Redevelopment Authority, Boston. September 1977, p.9.

TABLE B.8

DOWNTOWN BOSTON VACANCY RATES (1934 - 1978)

FROM BOMA OFFICE VACANCY SURVEYS

Date of Survey	% of Vacancy
May 34	29.00
May 39	24.80
May 44	15.42
May 49	4.28
May 50	4.69
May 51	4.79
May 52	3.64
October 52	3.72
May 53	3.74
October 53	3.84
May 54	4.30
October 54	5.33
May 55	4.95
October 55	4.52
May 56	3.43
October 56	3.55
May 57	3.42
October 57	2.69
May 58	2.94
October 58	3.52
May 59	4.68
October 59	5.48
May 60	5.98
October 60	8.06
May 61	5.11
October 61	6.76
May 62	4.60
October 62	4.60
October 63	7.35
January 64	10.90
October 64	9.20
April 65	8.40
October 65	8.40
April 66	6.90
October 66	7.40
April 67	7.50
October 67	5.00
April 68	3.40
October 68	2.70
April 69	2.90
October 69	2.40
April 70	1.70
October 70	2.40
April 71	4.20
October 71	8.10
April 72	6.90
October 72	5.20
April 73	5.20
October 73	10.70
April 74	6.00
October 74	7.80
April 75	7.30
October 75	7.50
April 76	11.50
October 76	12.10
April 77	15.10
October 77	13.60
April 78	10.10

Plaza, which proposes 1.5 million square feet of office space, and Copley Place, which plans for 600,000 square feet. The Federal government, which currently is leasing private office space in several downtown Boston private office buildings, is planning to begin construction of a new Federal office building in 1979. Upon completion of this new facility, the Government will vacate approximately 536,140 gross square feet of space and thus open up this space to the private office market. Approximately 56% of this space is Class A and 36% Class B, which are the more easily rented types of space; only 8% is the older Class C space. Between now and 1982, the projected absorption rate for all classes of office space will be slightly over 600,000 square feet annually, which should cause Boston's vacancy rate to fall below 6% in three years.[1]

Lafayette Place will contribute 100,000 gross square feet of new office space to the current total available space. At the present time, Class A space accounts for approximately 40%, or 15.1 million square feet, of the total and experiences the lowest vacancy rate by class. It is projected that between 1978 and 1985 total office space demand should increase by 6.0 million square feet.[2] The office space proposed by the Lafayette Place development, combined with the Park Plaza and Copley Place proposals, would total 2.2 million square feet. With this proposed increase, plus the existing surplus of 3.8 million square feet, the supply would actually approximate the demand. There will be, of course, other sources of increased office space during this period, including the space vacated by the Federal government, building conversions, and rehabilitation of Class C space. However, the current trend is toward an increasing demand for office space through the 1980's based on employment trends and the occupational shift projected for the City of Boston and the Boston SMSA. Between 1974 and 1986 City projections indicate a net gain in office employment for the Downtown area of approximately 41,000 persons.[3]

Given the projected demand conditions, the proposed Lafeyette Place development should help to meet this need and therefore beneficially impact the office market. At the same time, the market still would be able to absorb actively marketed and upgraded Class C buildings and thus strenghten that segment of the market.

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[1] Matrullo, Michael, "Boston's Office Market, A Brief Look at Construction and Vacancy Levels", Boston Redevelopment Authority, August 1978, p.2.

[2] Boston Redevelopment Authority, Supplemental Environmental Impact Report, Park Plaza Urban Renewal Project, Boston, p. 279.

[3] ibid, p. 280

In terms of the impacts of the Lafayette Place office space on employment in the City, it is estimated that 425 persons would be employed at various salary levels, for a total permanent employment of 1,558 persons. The average annual wage for the office employment is estimated at $13,000 per worker (BRA Research Department). Since approximately one of every three workers are projected to come from within the City, Boston's economy would be positively affected. In addition, construction of the office space is expected to generate an additional 433 construction man-years of work, with a payroll estimated at $7.16 million.

10. Community Facilities and Services

With the exception of sanitation services, the proposed addition of office space to the Lafayette Place project will not result in any adverse burden on community facilities and services (e.g, police and fire protection), all of which are adequate to serve the needs of the office space and its users. With respect to solid waste, it is estimated that the office proposal would add approximately 0.37 tons of waste per day,[1] or an increase of 2.6%. Total solid waste generated by the revised project, therefore, would equal approximately 14.83 tons per day, or 5,413 tons per year, which would require disposal at an approved landfill or incineration site. This increase is not considered to be significant and can be mitigated by the developer's commitment to the implementation of trash reduction measures or resource recovery systems.

11. Economic Analysis and City Revenues

The economic analysis of the addition of the 100,000 square feet of office space to the Lafayette Place project is detailed in Table B.9 (Table II.B.6, Revised), which also indicates the effects of the updated project cost and financing schedule and the incremental change from the project as originally proposed.

Tables B.10 to B.13 (revised Tables II.B.9 to II.B.12 of the Draft EIS) present the effect on municipal revenues and public investment of the project addition as well as the updated project financing schedule. The public investment required to implement the Lafayette Place project has increased by $3 million to $33,700,000 and will be accommodated in two ways. The $8,000,000 UDAG grant will absorb part of the public development costs, including the financial settlement of the Bedford-West Urban Renewal Project. This is a direct grant and will not require the assumption of debt service by the City of Boston. The remaining $25,700,000 public investment will be financed by Revenue Bonds and General Obligation Bonds issued for a 20 year period by the City of Boston and the Boston Redevelopment Authority. The present construction schedule for

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[1] Based on a generation of 0.9 lbs./capita/day for office workers and visitors, plus the addition of special wastes generated by the additional 530 persons daily population (Appendix R of Draft EIS).

Table B.9
(Table II.B.6 Revised)*

Economic Impact of the Lafayette Place Development

Summary Table

A. Public and Private Investment:

Sector	Total Development Costs (In millions)	Construction Related Costs (In millions)
Private Investment	$ 81.650 (+$40.4)	$ 49.7 (+$15.7)
Public Investment	33.7 (+$ 3.1)	24.4 (+$ 4.4)
Total Investment:	$ 115.350 (+$43.5)	$ 74.1 (+$20.1)

B. Economic Impact from Construction Activity

1. Employment and Income:

	Construction Jobs		Construction Payroll (In millions)	
	Project Total	Avg. Annual	Project Total	Avg. Annual
Private Development:	1,355 (+433)	339 (+109)	$22.36 (+$7.16)	$5.59 (+$1.79)
Public Development and Improvements	665 (+120)	166 (+ 30)	10.98 (+$1.98)	2.74 (+$0.49)
Total:	2,020 (+553)	505 (+139)	$33.34 (+$9.14)	$8.33 (+$2.28)

2. Multiplier Effect from Annual Construction Payroll on Local and Regional Econom

$16.66 million (+4.56M)

3. Annual State Tax Revenues Generated from Construction Activity:

Tax	
Personal Income Tax	$ 333,200 (+$ 91,200)
Business/Corporate and Miscellaneous Taxes	318,080 (+$100,480)
Total Annual Tax Revenue Generated by Construction:	$ 651,280 (+$191,680)

* Includes updated project financial statistics as well as addition of office space.

C. Economic Impact of New Development When Completed:

1. Sales, Employment, Income

Development	Annual Sales (In millions)	Avg. Annual Employment	Annual Payroll (In millions)
Private Development	$ 37.6	1,558 (+425)	$13,865 (+$5,525)
Public Development	-	8	.05
Totals:	$ 37.6	1,566 (+425)	$13,915 (+$5,525)

2. Multiplier Effect on Local and Regional Economy from Annual Employment Payroll:

$27.85 million (+$11.05M)

3. Annual Tax Revenues Generated from New Development after Completion:

Tax	State	City of Boston
Real Estate	-	$ 1,234,600 (+$234,600)
Personal Income Tax	$ 695,550 (+$276,250)	
Retail Sales Tax	600,000	
Hotel Room Occupancy Tax	370,000	
Meals Tax	660,000	
Business/Corporate and Miscellaneous Taxes	444,600 (+$204,000)	
Total Annual Tax	$2,770,150 (+$480,250)	$ 1,234,600 (+$234,600)
Annual Parking Garage Revenues to City:		$ 1,800,000
Annual Air-Rights Payment:		$ 150,000
Total Annual Revenues to City of Boston*:		$ 3,184,600 (+$384,600)

* After Year 22, following payment of debt service for Revenue and General Obligation bonds to finance portions of public investment.

D. Net Economic Impact on City of Boston Economy from Completed Lafayette Place Development:

		Current Level on site	New Development	Net Gain to City
1.	Annual Sales	0	$ 37.6 million	$ 37.4 million
2.	Annual Employment	10(est.)	1,566 (+425)	1,556 (+425)
3.	Annual Payroll	$60,000	$ 13.915 million (+$5.525M)	$13.855 million (+$5.525M)
4.	Total Annual Tax, Air-Rights, and Parking Garage Revenues to the City of Boston	$770,500	$3.184M (+$.384M)	$2.414M (+$.384

Notes for Table B.9

A. Public and Private Investment

Development and construction costs estimates furnished by Sefrius Corp. (private sector) and City of Boston (public sector).

B. Economic Impact from Construction Activity

1. Employment and Income

Construction employment and payroll based on total construction wages equalling 45% of total construction costs and average annual wages of $16,500 for construction workers. Time period for completing the project is 4 years.

2. Multiplier Effect

Multiplier effect on local and regional economy calculated by applying a multiplier of 2.0 to the annual disposable income from construction payroll.

3. Annual State Tax Revenues

Personal Income Tax - tax rate of 5% applied to 80% of total annual construction payroll.

Business/Corporate and Miscellaneous Taxes - based on assumption that 8% of gross business revenues represent taxable net income which is subject of an average effective tax rate of 8%.

C. Economic Impact of New Development When Completed

1. Sales, Employment, Income

Sales:

Retail:	based on $135 per square foot net leasable retail space.
Hotel:	based on average of $13,000 per room gross plus beverage and food sales at 62.5% of total room sales.

Employment:

Permanent job generation multipliers based on the following:

Retail - 300 sq. ft. per worker
Hotel - 4 rooms per worker
Parking - 250 spaces per worker
Maintenance - (estimate)
Management - (estimate)

Payroll:

Annual average salaries based on the following:

Retail - $ 7,200
Hotel - 8,600
Parking Garage - 6,800
Maintenance - 7,000

(Source: County Business Patterns, 1975, Massachusetts, assumption of 19% inflation rate April 1975 to April 1978 based on U.S.B.L.S. Boston Area C.P.I.).

2. Multiplier Effect

Multiplier effect on local and regional economy calculated by applying a multiplier of 2.0 to the annual disposable income from permanent payroll.

3. Annual Tax Revenues

Real Estate Tax - based on Chapter 121A in-lieu tax payments of $800 per year per hotel room and 23% of gross income from retail space.

Personal Income Tax - tax rate of 5% of total annual income.

Retail Sales Tax - 5% of total retail sales, excluding clothing, meals, and food sales. Clothing sales estimated at 21.4% of total retail sales, meals at 26%, and food at 9% (based on composition of CBD retail market from U.S. Bureau of Census, Census of Retail Trade ,1972).

Hotel Room Occupancy Tax - 5.7% of room sales.

Meals Tax - 6% of estimated restaurant expenditures.

Business/Corporate and Miscellaneous Taxes - based on assumption that 8% of gross business revenues represent taxable net income which is subject to an average effective tax rate of 8%.

Annual Parking Garage Revenues - based on gross income of $1,500 per space (@ 1,500 spaces = $2,250,000) less operating expenses of 20% of gross income ($450,000).

D. Net Economic Impact on City of Boston Economy

1. Annual Sales (current) - site presently supports parking lots and garage and vacant commercial buildings.

2. Annual Employment (current) - estimated

3. Annual Payroll (current) - based on annual salary of $6,800 for parking garage worker and $5,500 for parking lot worker.

4. Total Annual Revenues (current) - based on current tax revenues of $683,600 and current net parking revenues of $86,918.

Additional Notes for Table B.9

C.1 Office Employment Payroll - based on average of $13,000 per office worker (BRA Research Department)

C.3 Real Estate Tax (Office Space) - based on Ch. 121A in-lieu tax payments of 23% of gross rental of office space ($12/sq. ft.)

Personal Income Tax (Office Employment) - based on tax rate of 5% of total income.

Business/Corporate and Miscellaneous Taxes (Office Space) - based on assumption that 30% of gross office income of $100/sq. ft. represents profit which is subject to an average effective tax rate of 8%.

Annual Air-Rights Payment - based on 25% of net profits from the project, but not to exceed $150,000.

Table B.10
(Table II.B.9 Revised)

Total Public Investment by Year

Year 1	
Acquisition	
Jordan Marsh Annex & Bristol Block	$ 5,000,000
Code Realty Parcel	1,000,000
Hayward Place Garage Leasehold	400,000
Boston Edison Parcel (22,500 sf)	1,000,000
Sub-Total, Acquisition	$ 7,400,000
Demolition	
Jordan Marsh Annex Building	$ 700,000
HUD Note Retirement (Bedford-West)	$ 1,200,000
Lafayette Place Garage Design	$ 1,500,000
Total Year 1	$10,800,000
Year 2	
Construction	
Lafayette Place Garage	$ 7,500,000
New Essex Street	1,700,000
Street Widenings	1,500,000
Demolition	
Hayward Place Garage	$ 200,000
Total Year 2	$10,900,000
Year 3	
Construction	
Lafayette Place Garage	$ 7,500,000
Plazas and Other Public Improvements	4,500,000
Total Year 3	$12,000,000
TOTAL PUBLIC INVESTMENT	$33,700,000

Table B.11

(Table II.B.10 Revised)

Annual Debt Service for Lafayette Place Project by Year

Year 1

Acquisition and Demolition	
Total Acquisition and Demolition	$ 9,100,000
Lafayette Place Garage Design	1,500,000
HUD Note Retirement	1,200,000
Less: UDAG Funds	(6,800,000)
Total to be Financed	$ 5,000,000
Assume 20 year Revenue Bonds @ 6¼% with 8.83% constant payment	
Annual Debt Service Over 20 Years	$ 441,550
Total Debt Service Over 20 Years	$ 8,830,000

Year 2

Construction and Demolition	
Total New Garage & Hayward Place Garage	$15,200,000
Public Improvements	1,200,000
Less: UDAG Funds	(1,200,000)
Total to be Financed	$17,200,000
Assume 20 year General Obligation and Revenue Bonds @ 6¼% with 8.83% constant payment	
Annual Debt Service Over 20 Years	$ 1,518,760
Total Debt Service Over 20 Years	$30,375,200

Year 3

Construction	
Total Public Improvements	$ 4,500,000
Total to be Financed	$ 4,500,000
Assume 20 year General Obligation Bonds @ 6¼% with 8.83% constant payment	
Annual Debt Service over 20 Years	$ 397,350
Total Debt Service Over 20 Years	$ 7,947,000

Table B.12
(Table II.B.11 Revised)

Annual City Revenues Upon Completion of Project by Year of Start

Year 3	
Garage Revenue	
1,500 spaces @ 1,500 space	$2,250,000
less operating costs @ 20% gross	- 450,000
Sub total garage	$1,800,000
Total Revenue Starting in Year 3	$1,800,000
Year 5	
Taxes	
Hotel: 500 rooms @ $800/room	$ 400,000
Retail: 200,000 sf. NLA @ $3.00/sf	600,000
Office: 85,000 sf. NLA @ $12.00/sf. @ 23%	234,600
Air-Rights Payment	150,000
Total Revenue Starting in Year 5	$1,234,600
Total City Revenues by Year from Year 5 on	$3,184,600

Table B.13
(Table II.B.12 Revised)

Annual City Net Revenues upon Completion of Lafayette Place Project

Total Revenues for 22 Year Period

(a)	Garage (Yrs 3-22)	$36,000,000
(b)	Hotel (Yrs 5-22)	7,200,000
(c)	Retail (Yrs 5-22)	10,800,000
(d)	Office (Yrs. 5-22)	4,222,800
(e)	Air-Rights (Yrs 5-22)	2,700,000
	Total Revenue	$60,922,800

Total Debt Service for 22 Year Period

(1)	Acquisition & Demolition (Yrs 1-20)	$ 8,830,000
(2)	Construction of Garages and Improvements (Yrs 2-21)	30,375,200
(3)	Construction of Public Improvements (Yrs 3-22)	7,947,000
	Total Debt Service	$47,152,200

Total Net Income	$13,770,600
Average Net Income Over 22 Yr. Period	$ 625,936

the project will permit the staggered sale of these bonds over the first three years of the project construction period. The City, therefore, will be paying debt service on the public portion of this development for a 22 year period once the construction of Lafayette Place begins.

The net average yearly income to the City of Boston from all sources in the Lafayette Place project over this 22 year period is estimated to be $625,936 per year. This amount represents a decrease of some $144,582 from the estimated 1977 income to the City of $770,518 from the existing site due to the extensive bond financing required to implement the public portion of this project. However, following Year 22, the City would realize total annual revenues of $3,184,600.

As these tables indicate, total annual revenues to the City of Boston are expected to increase by $384,600 as a result of the office space addition and an annual air-rights payment, while at the same time total debt service also is expected to increase (by some $11 million over a 22 year period). Although the increased debt service will reduce anticipated average net income to the City during this period, the project still, in the final analysis, should result in substantial economic gains, both direct and indirect, for the downtown area and for the City as a whole, in terms of employment opportunities, retail sales, income and tax revenues, and the "spin-off" effects on the surrounding downtown retail area (as more fully described in the Draft EIS). While much of this impact in the City's economy will not be fully realized until several years after the development is complete, it is believed that the long-range benefits to Boston will adequately compensate the City for its initial investment in the project.

12. Aesthetic Character

According to the BRA Urban Design Department, the addition of the four stories above the retail core would have a beneficial aesthetic impact since it would increase the building height fronting Washington Street to equal the general height of buildings along this street (the most notable exception being the new Jordan Marsh addition of only two stories) and thus would relate more appropriately to the existing cornice height along this major downtown thoroughfare. The additional height was, in fact, recommended in the department's review of the original design of the proposed project.

Demolition of the Hayward Place garage will remove a structure that has no aesthetic character and which could be visually detrimental to the new Lafayette Place development. At the same time, the use of the cleared site as a temporary parking lot potentially could have the same adverse effects on the new development and the surrounding area as the existing parking lots. This condition, however, can be mitigated to some extent by the provision of extensive landscaping around the parking lot and by a set-back of the lot from the public sidewalk.

13. Historic Resources

In the opinion of the Boston Landmarks Commission staff, the Hayward Place garage has no historical or architectural value or significance that would be lost as a result of its demolition.

Increasing the height of the project along Washington Street from three stories to seven stories could result in greater adverse shadow effects on the richly detailed facades of the adjacent Washington Street theatre grouping, a district which currently is pending nomination to the National Register of Historic Places (43 FR 37231, August 22, 1978). The added height of the project at this location would cause more extensive shadowing of the adjacent properties. As noted in the Draft EIS, and the Section 106 review letter (Appendix T of the Draft EIS), final plans of the project will be reviewed by the Massachusetts State Historic Preservation Officer to determine the specific effect of the project and to recommend appropriate mitigation measures should any adverse impact be found.

Conclusion

In summary, the proposed revisions to the Lafayette Place development project, as described above, particularly the demolition of the Hayward Place garage and the addition of the office space component, are not expected to result in any significant adverse impacts on the quality of the human environment. While some additional adverse effects have been identified, appropriate mitigation measures are available and can be utilized to minimize or avoid these impacts.

Attachment B.1

Parking Demand and Traffic Generation Calculations for Office Space Addition to Lafayette Place Project

1. Parking Demand

The following factors have been used in estimating peak period parking requirements for the addition of 85,000 sq. ft. NLA of office space to the Lafayette Place project.

-- 6.2 person-trips per 1,000 sq. ft. of NLA (=530 person-trips)

-- A factor of 0.8 for peak parking accumulation

-- An auto occupancy of 1.3 persons/auto

-- An auto modal split of 0.3

Number of office trips generated = $\frac{6.2x0.3x85}{1.3} = 122$

Peak parking demand = 0.8x122 = 98 spaces

2. Peak Hour Traffic Generation

Trip generation rates for the additional office space has been calculated as follows (auto modal split = 0.3):

Period	Trip Generation Rates[1] Inbound	Trip Generation Rates[1] Outbound
Outbound P.M. Peak (5-6 P.M.)	0.2	2.35
Outbound Shopping Peak (9-10 P.M.)	0	0.2
Inbound A.M. Peak (7-8 A.M.)	2.75	0
Inbound Shopping Peak (7-8 P.M.)	0.1	0.2

---

[1] Trips per 1,000 sq. ft. NLA

Calculation of P.M. Peak Outbound Traffic:
2.35x0.3x85 = 60

Calculation of P.M. Peak Inbound Traffic:
0.2x0.3x85 = 5

Assuming that 100% of these trips will be related to the proposed Lafayette Place garage, the addition of office space will add a total of 65 vehicles entering or exiting the garage during the P.M. peak hours.

Generation of office-related inbound and outbound traffic during each of the three other peak traffic periods is calculated in a similar manner, and the results are presented on Table B.3.

Attachment B.2

VMT Analysis of Office Space Addition to Lafayette Place Project

Additional Trip Generation:

Office (100,000 s.f.)	Trips per Unit Size	Modal Split to Auto	Vehicle Occup.	Total One-Way Trips/Day
-employers (425)	4.2/1,000 s.f.	30%	1.3	156
-visitors (105)	1.1/1,000 s.f.	30%	1.3	40
				196

Annual VMT:

Office	No. One-Way Auto Trips	Average Length[1]	No. Days Per Year	Annual VMT
-employees	156	13 miles	250	507,000
-visitors	40	13 miles	250	130,000
	196			637,000

---

[1] Central Transportation Planning Staff, 1975 Synthetic Trip Tables

Total Annual VMT of Lafayette Place:

43,645,000 (original project) +637,000 = 44,282,000

less trip substitution of 1,548,555 = 42,733,445

Net change in auto trips = +9,091,445 (increase of 7.5% over net change of original project).

Increase in Metropolitan Boston ACQR VMT (15,811,258,340) = 0.057% (increase of 0.004% over original project).

PART C COMMENTS RECEIVED DURING REVIEW OF DRAFT ENVIRONMENTAL IMPACT STATEMENT

Federal

A. U. S. Environmental Protection Agency

B. U.S. Department of Transportation - Federal Highway Administration

C. Advisory Council on Historic Preservation

State

A. Executive Office of Environmental Affairs

B. Massachusetts Bay Transportation Authority

C. Water Resources Commission - Division of Water Pollution Control

Local

A. Boston Landmarks Commission

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

September 28, 1978

Director
Office of Federal Compliance
Boston City Hall
1 City Hall Plaza, Room 960
Boston, MA 02201

Dear Sir:

We have completed our review of the Draft Environmental Impact Statement (EIS) for the proposed Lafayette Place development Project.

The information provided in the Draft EIS indicates that the project will cause adverse environmental impacts in terms of increased noise and air pollution in the vicinity of the Lafayette Place site. Some of these impacts can be mitigated to a certain extent, and we urge the City of Boston to establish firm commitments in the Final EIS to undertake the mitigation measures suggested in the Draft EIS.

We do have concerns about the air quality impacts portion of the EIS, and these are discussed in the attached memorandum. Should you or your consultants wish to discuss these specific comments further, please contact Donald White, Chief of EPA Region I's Mobil Source Emission Section, at 223-5630.

In accordance with EPA's national rating system, we have rated this project and Draft EIS ER-2 (see enclosed explanation).

We regret that these comments are being transmitted after the close of the review period; nevertheless, we hope that they will be useful to you in preparing the Final EIS. I would appreciate receiving two copies of the Final EIS when it becomes available.

Sincerely,

Wallace E. Stickney

Wallace E. Stickney, P.E.
Director, Environmental & Economic Impact Office

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: September 25, 1978

SUBJECT: Draft EIS for Lafayette Place

FROM: Donald C. White, Chief
Mobile Source Emissions Section

TO: Wallace E. Stickney, Director
Environmental and Economic Impact Office

We have completed our review of the Draft Environmental Impact Statement (EIS) for Lafayette Place, Boston, Massachusetts. We have the following comments:

1. The short term CO monitoring network setup for this study is found to be unacceptable for the following reasons:
    a. Ambient air monitoring was performed for only two days, this is not a sufficient length of time to establish an acceptable data base for this case. ①
    b. The Energetics Science Series 2000 CO analyzer is not an EPA reference or equivalent method. Therefore, data collected using this instrument may be questionable. ②
    c. The quality assurance measures taken were not discussed in the EIS. ③
    d. Monitoring site locations are given, but site descriptions are insufficient to indicate whether or not the sites meet EPA sitting criteria. ④

2. A more detailed discussion of CO mitigating measures are necessary in the following three areas:
    a. Street traffic design parameters to reduce queuing effect on street traffic due to traffic coming from and entering into the Lafayette Place Garage. ⑤
    b. Method to reduce the usage of parking spaces in the Lafayette Place Garage, such as, encouraging the employees of Lafayette Place to use mass transit or carpools. ⑥
    c. Coordination among the local, regional, and state transportation planning agencies to improve the future transportation program, and thereby, to ensure the reduction in ambient CO concentrations in the vicinity of this facility. ⑦

SEP 23 1979

EPA Form 1320-6 (Rev. 3-76)

EXPLANATION OF EPA RATING

Environmental Impact of the Action

LO -- Lack of Objections

EPA has no objections to the proposed action as described in the draft environmental impact statement; or suggests only minor changes in the proposed action.

ER -- Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating federal agency to reassess these aspects.

EU -- Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1 -- Adequate

The draft environmental impact statement sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 -- Insufficient Information

EPA believes that the draft environmental impact statement does not contain sufficient information to assess fully, the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft environmental impact statement.

Category 3 -- Inadequate

EPA believes that the draft environmental impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft environmental impact statement is assigned a Category 3, no rating will be made of the project or action; since a basis does not generally exist on which to make such a determination.

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION ONE
100 Summer Street, Suite 1617
Boston, Massachusetts 02110

Subj: Draft EIS - Lafayette Place
Boston, Massachusetts

IN REPLY REFER TO:
HA-MA

August 16, 1978

Mr. Al Hom, Federal Compliance Manager
Office of Federal Relations
Boston City Hall, Room 960
One City Hall Square
Boston, Massachusetts 02201

Dear Mr. Hom:

On behalf of Regional Administrator Robert E. Kirby, we have reviewed the subject document transmitted with your letter of July 28, 1978. We have the following comments:

1. On the basis of the statements made in the third paragraph on Page 97, it is not clear what revisions are proposed for Bedford Street. The two sections described, from Chauncy to Kingston and from Chauncy to Church Green, overlap and would encompass conflicting traffic movements (two-way vs. one-way), as proposed. Furthermore, if it is intended to change the section of Bedford Street from Kingston Street to Church Green to one-way eastbound, then we feel that this revision should be reconsidered. It would necessitate redoing a substantial amount of the work to be performed under the Transit and Traffic Improvement Program and would not achieve the objectives cited. The best access routes to the expressway system for traffic exiting Lafayette Place will be via Kingston and Essex Streets. Also, the section of Bedford Street between Kingston Street and Church Green best serves as an ancillary access route from the north by remaining one-way westbound. ①

2. In order to minimize the disruption to traffic due to the proposed closure of Bedford Street, the scheduled starting date of construction on the new arterial street should be advanced as much as possible. ②

Sincerely yours,

Edwin P. Holahan
for N. J. Van Ness
Division Administrator

cc: RADM William S. Schwob
R. Horrigan - DPW - Boston

Advisory Council on
Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

September 22, 1978

Honorable Kevin H. White
Boston City Hall
One City Hall Square
Boston, Massachusetts 02201

Dear Mayor White:

We have received your letter of July 17, 1978, and your Draft Environmental Impact Statement of August 7, 1978, concerning the city of Boston's proposed Lafayette Place Development Project, Boston, Massachusetts, a project that may be assisted by an Urban Development Action Grant from the U.S. Department of Housing and Urban Development. That documentation supports your determination that the Lafayette Place Development Project will have no adverse effect on the Washington Street Theatre District, a property that has been determined to be eligible for inclusion in the National Register of Historic Places.

The Executive Director will not object to your determination of no adverse effect if the following condition is met:

> Prior to commencing construction the city of Boston will submit the final plans and specifications for the project to the Massachusetts State Historic Preservation Officer for review and approval. If, after review the State Historic Preservation Officer is of the opinion the undertaking will have an adverse effect on the Washington Street Theatre District, the City will request the comments of the Council in accordance with Section 800.4(e) of the Council's Procedures.

If you agree to this condition, please sign on the concurrence line below and return this letter to us. Upon receipt we will acknowledge that the Executive Director does not object to your determination of no adverse effect. This will satisfy your responsibility pursuant to Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320) and the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800).

Thank you for your cooperation.

Sincerely yours,

Myra F. Harrison
Assistant Director
Office of Review and Compliance

I concur:

____

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

EVELYN F. MURPHY
SECRETARY

STATEMENT OF THE SECRETARY

ON

DRAFT ENVIRONMENTAL IMPACT REPORT

The Secretary of Environmental Affairs herein issues a statement that the Draft Environmental Impact Report submitted on the below-referenced project does adequately and properly comply with Massachusetts General Laws, Chapter 30, Section 62 through 62H inclusive. However, the comments attached to this statement should be addressed in the Final EIR.

Environmental Affairs File No.: 03179

Submitted By: Boston Redevelopment Authority

Date Received: August 30, 1978

Project Identification: Lafayette Place, Boston.

DATE

EVELYN F. MURPHY, SECRETARY

COMMENTS OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS

ON DRAFT ENVIRONMENTAL IMPACT REPORT

EOEA #03179, LAFAYETTE PLACE, BOSTON

WIND

The EIR notes (p.272) that the BRA will require wind tunnel analysis during the design review process. This is an appropriate requirement for such a large structure in this densely settled urban area. However, some indication should be sought from qualified wind analysis experts on the potential for adverse wind impacts from the architectural design as it now exists in mass and overall design. Configurations, positioning, shape of particular structures, and proximity to abutting structures may all provide significant information on such impacts even at this early stage. Such input at this time could possibly save delays and expense in later stages. The final EIR should present the results of a preliminary wind analysis not based on wind tunnel testing but rather based on observation of the design and arrangement of the site as currently envisioned. ①

AESTHETICS

The description of the proposed structures and their visual compatibility with the surrounding area is sensitive to the perspective of pedestrians walking on nearby streets. However, we should know how the proposed structure might affect the visual landscape from Boston Common. Several major projects are in the planning stages in the vicinity, some of them with significant heights. The completion of all these projects could create or could lead to the creation of a visual barrier or box around certain edges of the Common. The Final EIR would benefit from the inclusion of renderings depicting the structure from several vantage points on the Common. ②

AIR MONITORING

It is stated on page 139 that a short-term air quality monitoring was undertaken at certain intervals over a two-day period around the project site. While this procedure did provide initial figures on ambient CO concentration, it cannot be argued that the data are statistically significant in any way. The timing of the project and the apparent urgency to begin the initial development phase make further background monitoring impractical at this point for consideration in the EIR. While the air quality analysis report appended to the main text of the DEIR was quite thorough and well researched, given the limitations of the available data, normal circumstances would require a short-term monitoring program conducted continuously over a six to eight week period. The BRA should consider such longer range background monitoring on its future major development projects. ③

TRANSPORTATION NETWORK

The success of the transportation systems in suitably accommodating post-project loads, including traffic circulation, transit, and especially pedestrian circulation systems, relies very heavily on completion and permanent adoption of the city's Transit and Traffic Improvement Program (TTIP). The agencies involved in the TTIP have applied for UMTA funding, and a one year demonstration project has begun. However it is not clear what happens after this one year program terminates. The Final EIR should describe provisions for assuring the permanent implementation of the TTIP. If it is possible that the TTIP elements may be discontinued, the Final EIR should describe alternatives to those elements described in the Draft EIR. Finally, as the TTIP itself does not describe alternative circulation patterns in the project area, the Final EIR should briefly discuss such alternative circulation patterns and why those in the TTIP and the Lafayette Place project area were ultimately selected. ④

CONSTRUCTION PHASE

Several major projects in the vicinity of Lafayette Place will be in the construction phase simultaneously. There are thus potential problems with dust control and traffic noise and congestion from trucking. The Final EIR should describe what procedures will be implemented to manage construction phase impacts from a citywide perspective. ⑤

CONCLUSION

In discussions prior to submission of the Draft Environmental Impact Report the BRA indicated that substantial efforts would be directed towards responding to any comments which I would have on the Draft EIR after the public comment period had run its course. My statement that the Draft EIR does adequately comply should not be misconstrued as a signal that the need for such effort is not there. I was encouraged by the BRA's indications and I fully trust that every effort will be made to address these comments prior to submission of the Final EIR.

DATE

EVELYN F. MURPHY, SECRETARY

EFM/REG/jmdi

cc: Robert Ryan, Director, BRA
Richard Mertens, BRA

MASSACHUSETTS
BAY
TRANSPORTATION
AUTHORITY

50 High Street, Boston, MA 02110

September 11, 1978

Al Hom, Federal Compliance Manager
Office of Federal Relations
Boston City Hall, Room 960
One City Hall Square
Boston, MA 02201

Dear Mr. Hom:

Re: Draft Environmental Impact Statement
Lafayette Place - July, 1978
Boston, Massachusetts
Urban Development Grant Program

I am forwarding to you the Massachusetts Bay Transportation Authority comments on the Draft Environmental Impact Statement for the Lafayette Place UDAG Project in Boston, Massachusetts.

The MBTA comments are submitted to be considered in refining the plans and developing the Final Statement prior to approval and implementation of the project.

Sincerely yours,

Charles B. Steward

Charles B. Steward
Environmental Coordinator

CBS:mg
Enclosure

Massachusetts Bay Transportation Authority

Comments
on the
Lafayette Place
Draft Environmental Impact Statement
July, 1978

I Text: L.P./D.E.I.S Page 10 Item #6 to the Key Components of the Lafayette Place project.

> 6. Construction of a public interior pedestrianway linking the two shopping levels of Lafayette Place to the Jordan Marsh retail store and to the Washington Street subway station. Vertical connections, in the form of escalators and elevators, will provide interconnection between these two levels and with the underground parking garage. In addition, the existing underground loading dock of Jordan Marsh will be extended and enlarged to provide an adequate service area for the Lafayette Place center.

MBTA Comment

1. What is component #6 trying to do?

Component #6 did not explain the plans well for the Lafayette Place public interior linkage. ①

2. Several years ago the MBTA started design of Washington Station Modernization. The agreement was that the link to Lafayette Place would occur in Jordan's basement near Washington Street. The work the MBTA has done at the station is based on this plan. ②

For years the Lafayette Place project was dormant. Now that the MBTA work on the Lafayette linkage has been completed, the developers and Jordan's have come up with a new Lafayette linkage plan.

The new scheme provides a linkage through the ground floor of Jordan's near Chauncy Street. At Summer Street (opposite Kennedy's) they propose that an escalator connection to the Washington Station concourse be built in the widened pedestrian way. This would reach the concourse (20' below the street) near its midpoint, just east of the stairs from the Red Line. It would knock out one or two of our proposed concessions. The MBTA has spent $2.3 million on the station and concourse based on plans made several years ago.

Funding is not available for the new connection.

II Text: L.P./D.E.I.S. Page 10.

> Figures 1.4 to 1.8.e illustrate the current plans and designs of the complex as well as show views of the project model.

MBTA Comment

1. Figures 1.4 to 1.8e do not have an illustration of current plans and designs for concourse Level. ③

III Text: L.P./D.E.I.S. Page 63 Reference to second paragraph.
Part 11.A. PHYSICAL ENVIRONMENT
4. Transportation Network

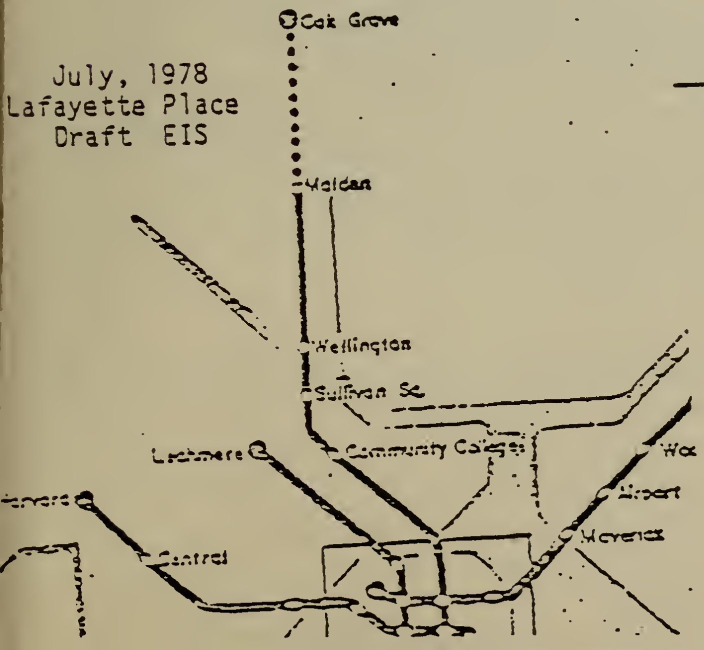
The Boston metropolitan area is served by a regional transportation system of core-oriented radial highways and public transit. In 1972, cordon counts by the City of Boston indicated that 884,000 persons entered and left the core area (Boston Proper) by all modes on an average day, 7 A.M. to 12 midnight. The number of people entering during the morning peak hours (8 A.M. to 9 A.M.) was approximately 115,000 and the number leaving during the evening peak hour (4:30 P.M. to 5:30 P.M.) was approximately 145,000. Fifty-three percent of the morning trips and fifty percent of the evening trips were made by public transit. However, a Wilbur Smith study in 1972 indicated that about 60% of the total day-time population used public transit to enter the city core area. This extensive use of transit can be explained by the fact that conditions in the city core (intense development and congestion) tend to encourage the use of transit. It should be noted, on the other hand, that trends in the past decades have shown a continually decreasing use of public transit and, if present trends continue, the modal split by 1980 could be 55% transit and 45% auto (see Figure II.A.10).

MBTA Comment

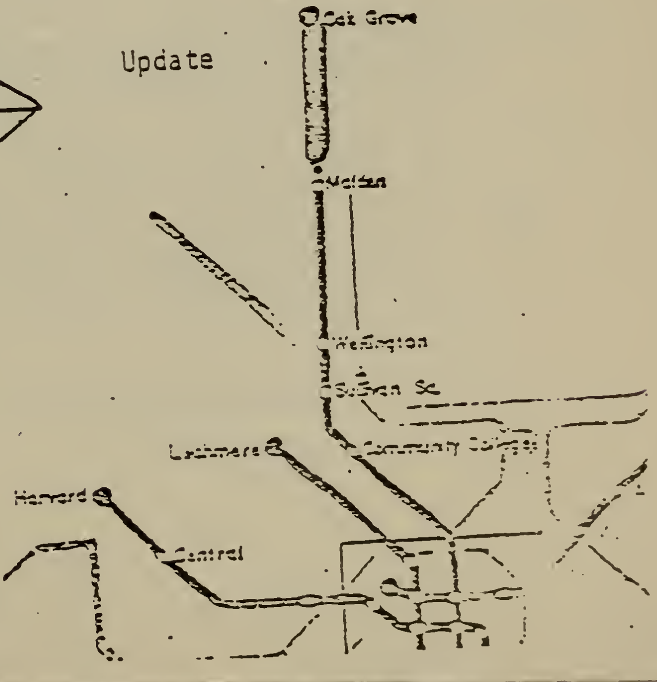
1. The use of the MBTA system has been increasing in the last 2 to 3 years. It is true that prior to this period their statement of decreasing use is valid. ④

IV Text: L.P./D.E.I.S. Page 75 MAP.
1977 Rapid Transit Network

July, 1978
Lafayette Place
Draft EIS



Update



MBTA Comment

1. The Orange Line extension to Oak Grove is completed and the station is in operation. ⑤

V Text: L.P./D.E.I.S. Pages 76-78.
1977 Rapid Transit Network

MBTA Comment

1. Update information on Orange Line, Red Line and Blue Line. ⑥

   (a) Orange Line and Blue Line are obtaining new vehicles.

   (b) Extensions for the Red Line is in the process of development and construction. The Red Line Extensions are (1) Northwest-Harvard Square to Alewife and (2) South-Quincy Center to Braintree.

VI Text: L.P./D.E.I.S. Page 78.

> Bus Service
>
> At the present time, four suburban express bus routes serve the project area - 300 (Riverside), 301 (Brighton), 304 (Watertown), and 305 (Waltham). The downtown terminal is at Chauncy and Summer Streets, behind the Jordan Marsh store. Current daily two-way ridership on the four lines totals approximately 11,000 person-trips.
>
> The nearest local bus service is Route 43 (Egleston-Stuart) which travels along Tremont Street one block from the project area, and Route 49 (Northampton-Kneeland), which connects to the Essex Street subway station. South Boston routes (6 and 7), a North Station-South Station loop, and a Haymarket connector (Route 3) stop at South Station.
>
> Under the TTIP proposal, a significant expansion of local bus service will be provided to the retail core area from the Boston neighborhoods. This service will include Routes 43 and 49 from the South End/Roxbury areas, which will transverse Washington Street, Route 7 and 11 from South Boston, along Summer and Chauncy Streets, and Routes 92 and 93 from Charlestown, operating on Chauncy-Bedford-Washington Streets. The increased penetration into the downtown will result in a greater accessibility for city residents. This, along with improved service due to exclusive bus lanes and reduced delays and congestion, is expected to lead to a 15% increase in ridership. (A 3% rise in transit ridership is also anticipated.)

MBTA Comment

1. Transit and Traffic Improvement Program (TTIP) should be updated. ⑦

(a) T.T.I.P. is presently named Downtown Crossing.

(b) The paragraph should be in present tense.

(c) The new bus service should be updated.

VII Text: L.P./D.E.I.S. Page 79.

Table II.A.7

Potential Percentage of 1980 Projected Peak Hour MBTA Passenger Volumes to Carrying Capacity[1]

	Red Line[2]	Orange Line[3]	Blue Line[4]
Estimated 1980 maximum peak hour volume	17,591	12,534	8,672
1980 volume to current operating carrying capacity	103%	124%	102%
1980 volume to capacity @			
4-car trains 2 min. headway	82%	71%	58%
6-car trains, current headway	68%	83%	68%
6-car trains, 2 min. headway	55%	47%	39%

1 Does not incorporate schedule unreliability or unusual maintenance problems. Projections for Green Line not available.

2 Assumes extension to Braintree only.

3 Assumes extension to Needham, Route 128, and Oak Grove

4 Assumes extension to Central Square, Lynn

Source: Executive Office of Transportation and Construction (Massachusetts), Technical Supplement to the Program for Mass Transportation, Vol II; Existing Plant and Facilities, April 1977 (draft)

MBTA Comment

1. Print the number of riders per car for each line. ⑧

Red Line -	blue bird car (Ashmont)	200 riders/car
	silver bird car (Quincy)	151 riders/car
Orange Line		148 riders/car
Blue Line		116 riders/car

2. Orange Line and Blue Line will be obtaining new vehicles; therefore will provide additional ridership and capable of increasing service. ⑨

VII Text: L.P./D.E.I.S. Pages 85-86.

Downtown Transit and Traffic Improvement Program

MBTA Comment

1. Please make the necessary changes to update the "Downtown Crossing" on Page 85 and Appendix E. and including the "Downtown Crossing" map on Page 86. ⑩

IX Text: L.P./D.E.I.S. Page 87 Reference to last paragraph.

Traffic Characteristic of the Proposed Project

(1) Traffic Influence Area

> The existing retail developments offering the greatest competition to the site are North Shore Shopping Center, Burlington Mall, Shoppers World, Chestnut Hill Shopping Plaza, and South Shore Plaza. Based on characteristics of similar developments, it is estimated that approximately 75 percent of the patrons of Lafayette Place will live within a 30-minute driving time of the center. The primary area thus was assumed to be within 30 minutes driving time of the site, except wherever competing centers vied for the same market, in which case the primary area was designated as being midway between the competing site and Lafayette Place. The areas affected by competition were designated secondary areas of influence.

MBTA Comment

1. Additional competition to Lafayette Place retail development is in the City of Boston - Quincy Market, Downtown Crossing and Back Bay. ⑪

Competition for the Lafayette Place retail development is not only in suburban shopping centers.

X Text: L.P./D.E.I.S. Page 103.

> analysis by Barton-Aschman, it is estimated that an additional 255 riders would be added to the transit lines during the P.M. rush hour period, distributed among the four lines according to the distribution pattern of origin to the site. Highest percentages - 30% or 73 riders - would be added to the southbound Red Line and northbound Orange/Blue Lines. The maximum project-generated increase would be 0.9% on the Blue Line, which is already over-capacity at rush hour.

During the morning, the majority of the inbound trips are assumed to occur after the A.M. peak hour (8-9 A.M.), since the retail stores generally are not expected to open before 9 o'clock. Although the majority (90%) of the 1,141 employees are expected to use public transportation (including buses) or to walk to the site, their number and time of arrival is not expected to affect significantly rush hour transit capacity. Minimal transit use is projected for the hotel guests and visitors.

Futhermore, programs planned or under consideration by the MBTA to improve transit service in the future, including the use of 6-car trains and reducing headway times, are expected to increase the capacity of the system (see Table II.A.7 above). If these improvements are implemented by the time the Lafayette Place project is opened, sufficient capacity should be available to accommodate future demands generated by the project. At the same time it should be noted that projected normal growth in downtown daytime population (and their potential transit ridership) plus the addition of patrons from such major development projects as Park Plaza (which, for the most part, is not expected to occur until after Lafayette Place has been built) could increase use beyond programmed capacities at certain periods.

MBTA Comment

1. With additional equipment the MBTA will have more trains and will easily handle increase ridership. ⑫

2. Include the number of additional riders generated for the entire day. Some riders may be shopping trips and not only peak hour trips. ⑬

3. The use of the 6-car train will not occur until the late 1980's on the Red Line. ⑭

XI Text: L.P./D.E.I.S. Page 103, Reference to third and fourth paragraphs.

Public Transportation

As part of the transit improvements, a station modernization program currently is underway by the MBTA, the results of which will favorably impact the Lafayette Place project. Reconstruction of the Washington Street station will provide a new fare-free passage and underground shopping concourse between Jordan's and Filene's basements, new entrances to the stores and streets, new stairs and escalators, and new fare collection points. Transfers between the Orange Line and Red Line will make use of a refurbished under-track passageway, and an existing tunnel between Park Street and Washington Street will be opened as a pedestrian connection, allowing a protective, weather-free passage from the Green Line directly to Jordan Marsh/Filene's and the Lafayette Place project via proposed public pedestrian easements.

The Essex Station also will be modernized under this program and will include the opening of a tunnel along Washington Street on the northbound side and adding new circulation elements to connect to the Lafayette Place development. Platforms also will be lengthened to accommodate 6-car trains. At the present time, the Park Street station is undergoing a substantial facelifting as well.

MBTA Comment

1. The statement that the modernization program will include a tunnel along Washington Street on the Northbound side is incorrect. While at this point we remain open minded, funding for a tunnel is not available. ⑮

2. The use of 6-car trains on the Orange Line will not occur in the near future. ⑯

General Comment

All statistics should be accurate and updated. ⑰

KG

FFICE OF THE DIRECTOR

The Commonwealth of Massachusetts
Water Resources Commission
Division of Water Pollution Control
110 Tremont Street, Boston 02108

RECEIVED

AUG 24 197

OFFICE OF THE SECRETARY OF
ENVIRONMENTAL AFFAIRS

August 21, 1978

Ashvin Patel, Associate Planner
E.O.E.A.
100 Cambridge Street
Boston, Massachusetts 02202

Re: Environmental Notification Form

Attention: MEPA Section

Dear Mr. Patel:

The Eastern Regional Office - Division of Water Pollution Control has reviewed the Environmental Notification Form for: Lafayette Place, BRA Boston, E.O.E.A. # 03179.

The following areas should be addressed in the Environmental Impact Report:

SEWER SYSTEM

Adequacy of the existing system to accept the increased flows generated by this project ①

SEWER EXTENSION PERMIT

A sewer extension permit must be applied for through the Division of Water Pollution Control ②

Should you have further comments or questions please contact this office at 727-6373.

Very truly yours,

Sabin M. Lord

Sabin M. Lord, Jr.
Eastern Regional Engineer

SML/adb

September 1, 1978

Mr. Kane Simonian
Acting Director
Boston Redevelopment Authority
Boston City Hall
Boston, MA 02201

Dear Mr. Simonian:

In response to your request of August 30, 1978, for comments on the Draft Environmental Impact Report, the staff of the Boston Landmarks Commission has reviewed said Report. Previous comments regarding National Register eligibility and effects of the project on potential NR areas are included in Appendix U of the Report. In summary, the staff concurs with the findings of the Report as noted on p. 238, Part II, C. 2.6; that the project would have no adverse effect on adjacent potentially eligible NR properties pending review of final plans for the Washington Street facade and other elements that effect adjacent historical properties.

Sincerely,

Marcia Myers
Executive Director

J/7953

cc: Al Hom, Federal Compliance Manager
Office of Federal Relations, Boston City Hall
Patricia Weslowski, S.H.P.O., M.H.C.
Richard Mertens, BRA Environmental Clearance Officer

Mr. Kane Simonian
Acting Director
Boston Redevelopment Authority
Boston City Hall
Boston, MA 02201

PART D RESPONSES TO COMMENTS RECEIVED

Part D RESPONSES TO COMMENTS RECEIVED

Federal Agencies

A. U.S. Environmental Protection Agency

1.* Ambient air monitoring period

The project proponents recognize the shortness of the ambient air monitoring program and its insufficiency to provide an acceptable data base for this project. Subsequent to the completion of the Draft EIS, Bolt Beranek and Newman, Inc., undertook a longer term (2-2½ weeks) air quality monitoring program in downtown Boston in support of the Transit and Traffic Improvement Program (currently known as "Downtown Crossing"). Three sites in the vicinity of the Lafayette Place project area were selected for monitoring - Post Office site (Milk Street), Arch Street, and Winter Street. The study measured ambient carbon monoxide conditions at all three sites and NO/NO_2 concentrations on Arch Street (as well as noise and wind speed and direction at all or some of these sites). Applicable sections of the consultant's report (Technical Memorandum - Air Quality, Noise and Wind Measurements in Support of the Boston Downtown Freedom Mall Project, by K.M. Chng and P.A. Gardner, Bolt Beranek and Newman, Inc., Cambridge, August 1978) are attached as Attachment D.1 and include the results of the monitoring program and descriptions of the monitoring sites, methodology and calibration details, and monitoring equipment.

In summary, the results of the monitoring program indicated the following carbon monoxide concentration data for the three measured sites:

	1-Hour Average (ppm)			8-Hour Average (ppm)		
Site	Min.	Max.	No. Violations	Min.	Max.	No. Violations
Milk St.	0.6	20.2	0	1.5	12.7	3
Arch St.	<0.5	15.7	0	0.1	7.4	0
Winter St.	0.8	26.3	0	1.8	15.2	7

During the preparation of this Final EIS, staff of the Boston Redevelopment Authority met with staff of the EPA, Region I, to discuss the EPA comments and additional data requirements. A copy of the BB&N study was submitted to EPA for their review. Subsequently, EPA indicated that, based on their preliminary examination, the data contained in the BB&N study appeared to be acceptable for the Final EIS.

2. Acceptability of monitoring equipment

Although the Energetics Science Series 2000 CO Analyzer (Ecolyzer) is not an EPA reference or equivalent method, it is a reliable instrument, widely used for use in short term monitoring programs such as performed for this project. The consultant's (Parsons Brinckerhoff Quade & Douglas, Inc.,) experience has shown that when the instrument is calibrated frequently (see response 3. below), as was the case during the Lafayette Place Ambient Air Monitoring Program, the Ecolyzer gives results comparable to measurements made using the more cumbersome EPA reference instrument (NDIR).

---

* Numbers refer to numbered comments in Part C.

3. Quality assurance measures

The CO Analyzer was calibrated both before and after each of the hourly monitoring periods. The procedure included zeroing the instrument using the internal electronics of the instrument, spanning the instrument using a known reference CO concentration gas and adjusting the instrument accordingly. The meteorological instrument used did not contain any provision for field calibration but had been factory calibrated within a relatively short period of time prior to the measurement period.

4. Monitoring site descriptions

A description of the ambient CO monitoring sites, utilizing applicable portions of the EPA "Site Description Data" form, is attached as Attachment D.2.

5. Design parameters to reduce queuing

As indicated on page 106 of the Draft EIS, the proposed Lafayette Place garage is being designed to handle adequately expected usage without resulting in problems of delay or queuing. Three (reversible) travel lanes will be provided at each of the two entrance/exit points and will be able to handle a maximum of 600 inbound or 350 outbound cars per hour per lane. Since peak hourly volume for the garage is estimated at 800 cars (400 inbound and 400 outbound), the garage should have ample excess capacity at its entrance/exit points to prevent unnecessary queuing. Any potential queuing effects resulting from garage traffic will be addressed in detail by the architects and engineering consultants as the project enters the detailed design stage. At this time, the following additional measures have been adopted or will be considered and adopted to the extent feasible:

1) Entrances and exits will be aligned with Bedford Street and Harrison Avenue Extension for direct access to the street system.

2) Entrances and exits will be designed to a width adequate to accommodate entering and exiting traffic with minimum delay.

3) The number of entrance and exit windows and the method of payment will be designed to reduce delays.

4) Traffic signals will be adjusted to accommodate garage traffic.

6. Methods to reduce employee parking:

The major objective of the garage design has always been to encourage short-term shopper parking. It is a firm City commitment to discourage all-day parking in the garage facility. The project's direct connection to Boston's busiest subway station and the fact that fewer than 10% of Jordan Marsh employees use autos today (page 91 of the Draft EIS) support the prediction that transit use among future employees will continue to be high. The following measures will also be taken to discourage all-day parking:

1) No spaces will be reserved for hotel, retail, or office employees.

2) No monthly employee rates will be offered.

3) Rates will be set to encourage short-term parking; i.e., flat hourly rate with no all-day maximum[1]

4) Tenants will be encouraged to offer MBTA passes to employees (Jordan Marsh does today) and car pooling incentatives.

7. Coordination among local, regional and state agencies:

As the central city in a metropolitan region of three million persons, the City of Boston and the Boston Redevelopment Authority have participated jointly with EPA, the State and regional agencies for the past decade in a number of efforts to coordinate transportation and air quality planning, including:

1) Development of a federally-mandated transportation control plan and implementation of a parking freeze in downtown Boston (originally in conjunction with EPA, now with the Massachusetts Executive Office of Environmental Affairs. Lafayette Place has received a freeze permit from the Boston Air Pollution Control Commission.

2) Participation with the Central Transportation Planning Staff in the development of the Transportation Systems Management element of the Unified Work Program, of which the downtown Transit and Traffic Improvement Program is a key element.

3) Participation with EOEA and CTPS in development of the State Implementation Plan for improved air quality.

4) Continual interest and participation in regional transit planning for improved operations, extensions, and improved fringe parking and bus access in suburban areas.

5) Participation in the State's growth policy process, both at the overall policy statement level and in detailed project planning.

---

[1] Article V, Section 5.06 (iv) of the Tripartite Agreement among City of Boston, Boston Redevelopment Authority and Lafayette Place Associates, dated 1978.

These efforts will continue in the future. In addition, the EPA recently has invited the City of Boston to submit an application for an Air Quality Technical Assistance Demonstration Program grant to develop innovative plans to attain national air quality standards while maintaining the City's ability to attract and retain business and industry. The development of such plans will require close coordination with local, regional, and State agencies responsible for developing revisions of the Massachusetts State Implementation Plan. A copy of the City's Letter of Intent to compete for a grant is included as Attachment D.3.

B. U.S. Department of Transportation - Federal Highway Administration

1. Conflicting traffic movements on Bedford Street

The statement in the third paragraph of page 97 of the Draft EIS is obviously in error and should be corrected as follows: "To improve access to and egress from the Lafayette Place garage, Bedford Street will be widened and made two-way between Chauncy and Kingston and one-way eastbound between Kingston and Church Green ...." The section of Bedford Street between Chauncy Street and Kingston Street was made two-way so that vehicles could leave the garage via the Chauncy Street exit but have an eastbound alternative to going northbound and threading their way through downtown. The initial routing would be along Bedford Street to Kingston Street to Essex Street and the Surface Artery. Bedford Street between Church Green and Kingston Street would remain westbound until the new arterial street is connected to the Surface Artery at some future date. Then, this block of Bedford Street is proposed to be made eastbound. Church Green channelization as constructed for the TTIP fits both the eastbound or westbound Bedford Street pattern.

2. New arterial street construction

Planning and preliminary design for the new arterial street (now known as New Essex Street) are underway. In addition, a request was made to the State in 1975 to have the street declared eligible for Urban Systems funding. Even if time constraints make early construction of the permanent street impossible, a temporary street will definitely be constructed in the same alignment between Kingston Street and Washington Street before Bedford Street is closed.

C. Advisory Council on Historic Preservation

Pursuant to the letter of September 27, 1978, from the Advisory Council on Historic Preservation, the Mayor of the City of Boston, as the Chief Executive Officer of the applicant for UDAG funds for the Lafayette Place project, has concurred with the condition that final plans and specifications for the project be submitted to the Massachusetts State Historic Preservation Officer for review and approval prior to commencement of construction. A copy of the signed concurrence is attached (Attachment D.4.). Accordingly, the Executive Director of the Advisory Council will not object to the determination of the no adverse effect made pursuant to Section 106 of the National Historic Preservation Act of 1966, and all Section 106 responsibilities of the applicant will have been satisfied.

State Agencies

A. Executive Office of Environmental Affairs

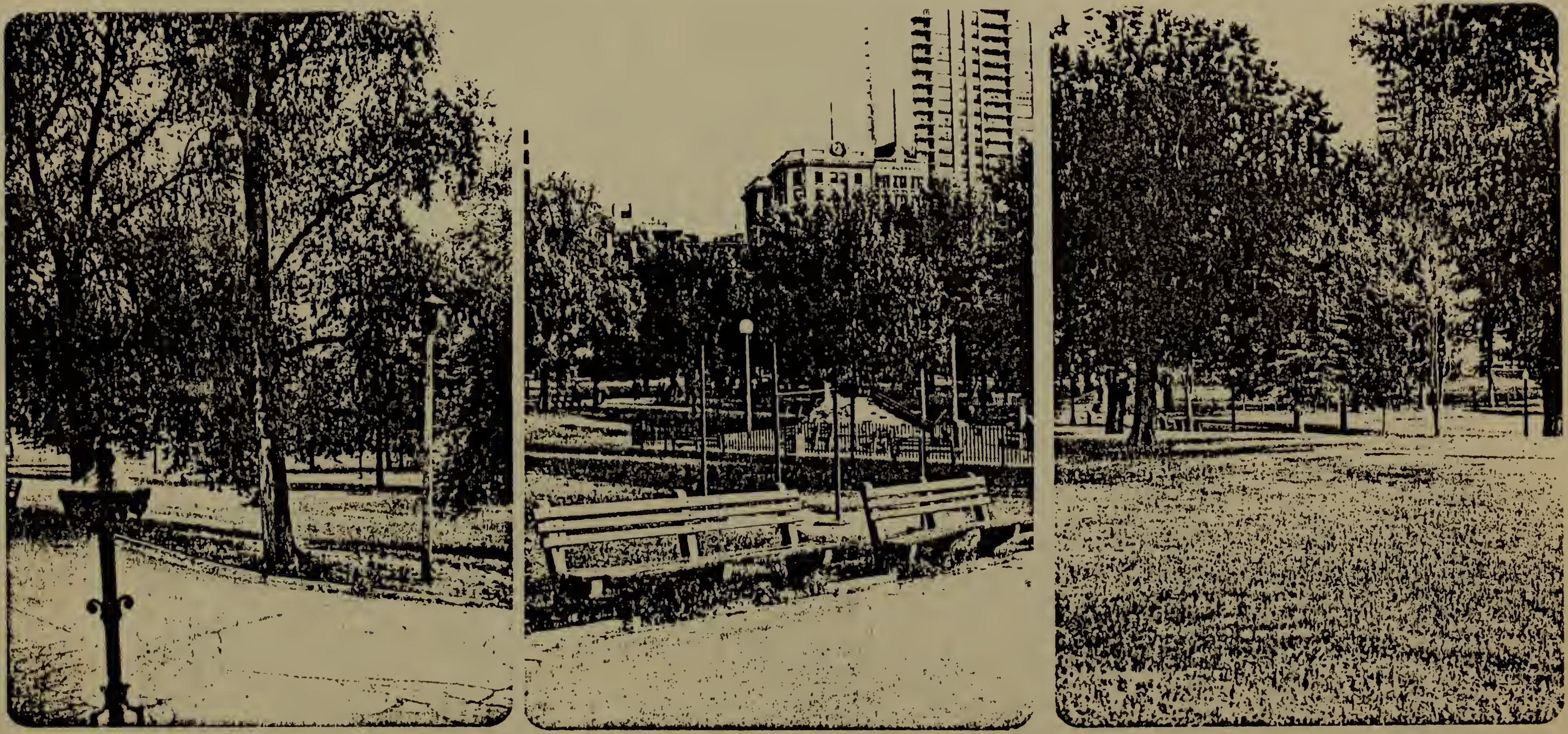
1. Need for wind analysis

In response to the request of EOEA, the BRA engaged R.E. Hayden of Bolt Beranek and Newman, Inc., to provide a preliminary wind analysis of the Lafayette Place project in order to ascertain the possibility of adverse wind effects in and around the project. A copy of the consultant's report is included as Attachment D.5.

In summary, the Hayden study found that, although some wind impacts normally could be anticipated from the construction of the project, no significant adverse effects were expected and potential problems that were identified could be reduced by straightforward mitigation measures (e.g., the construction of parapets or wind screens). The study further found that the general arrangement of the components of the project was quite favorable for minimizing wind impact once the direction of the prevailing winds was considered and no large-scale rearrangement of the project was recommended. Some pedestrian discomfort may be expected along Washington Street and possibly within the enclosed arcade area from northwest winds, and more substantial pedestrian problems may occur along Chauncy Street during easterly winds. At the elevated pedestrian area adjacent to the hotel tower, where an outdoor pool and other guest facilities are proposed, general discomfort was predicted due to the combination of the high-rise with the low-use structures around it and its exposure to relative high wind speeds. When the project design is finalized, the study recommended that a wind tunnel test be performed to quantify the magnitude of predicted winds and to determine potential wind speed levels at pedestrian heights.

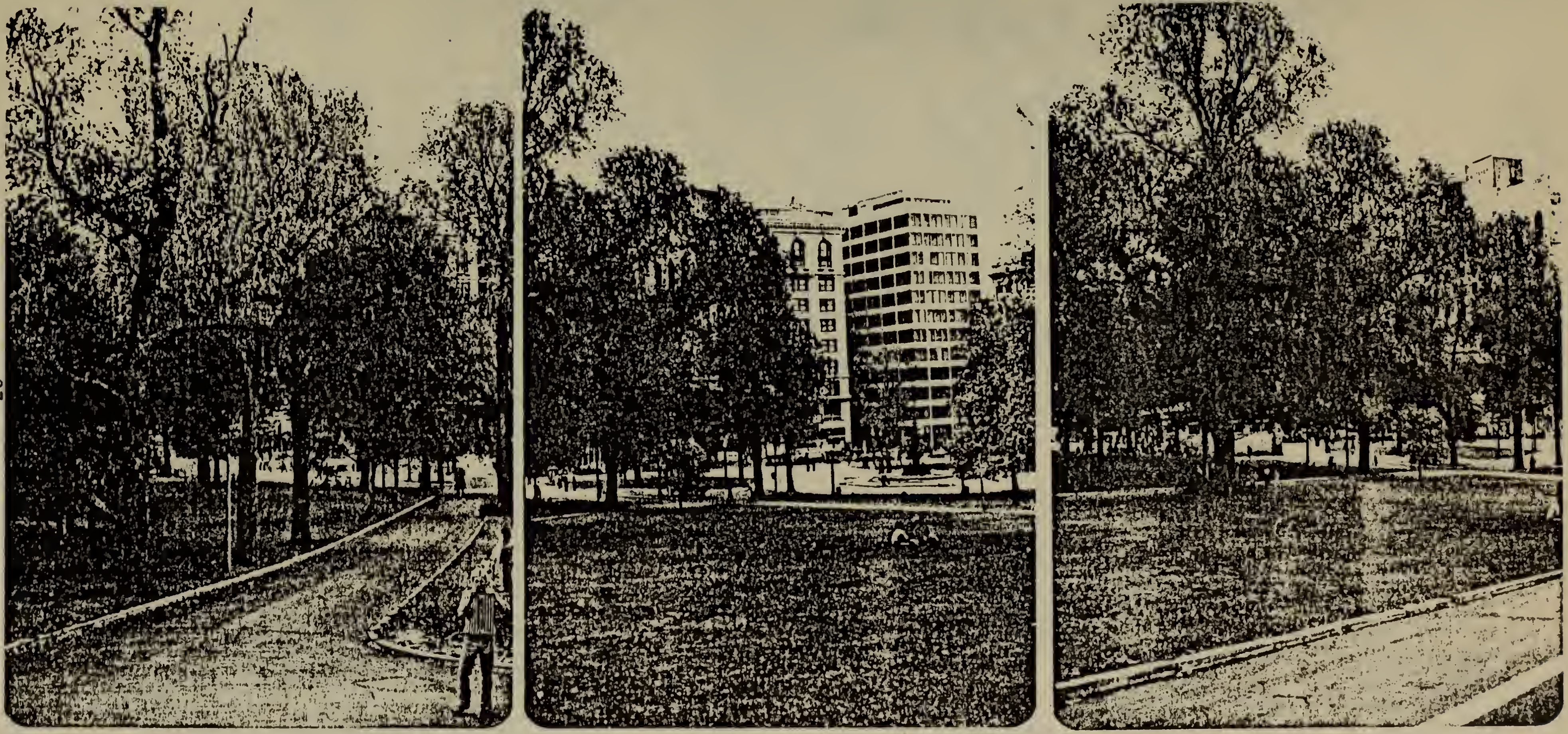
2. Aesthetic impact on Boston Common

A series of photographs taken from several vantage points on the Boston Common (Figures D.1 to D.3) indicates that in general only the hotel tower would be visible from the Common and only from a relatively few points at that (e.g., Figure D.1(2)). For the most part, distant views from the Common are hidden by the existing trees. From Tremont Street, the proposed structure would be visible only to one looking directly down West Street or Avery Street; the existing buildings along Tremont Street would hide any view of the project from other points along the Common side of this street. These observations are confirmed by sketches of the project from a number of locations in the Common (Figures D.4 to D.8). (Sketches D.6 and D.7 actually are elevated views of the project rather than street-level views; the existing tree cover in the Common would mask the project at the pedestrian level.)



(1) (2) (3)

Figure D.1: Views towards Lafayette Place Project from Boston Common - Beacon and Park Streets Corner



(4) (5) (6)

Figure D.2: Views towards Lafayette Place Project from Boston Common - Beacon Street and Interior

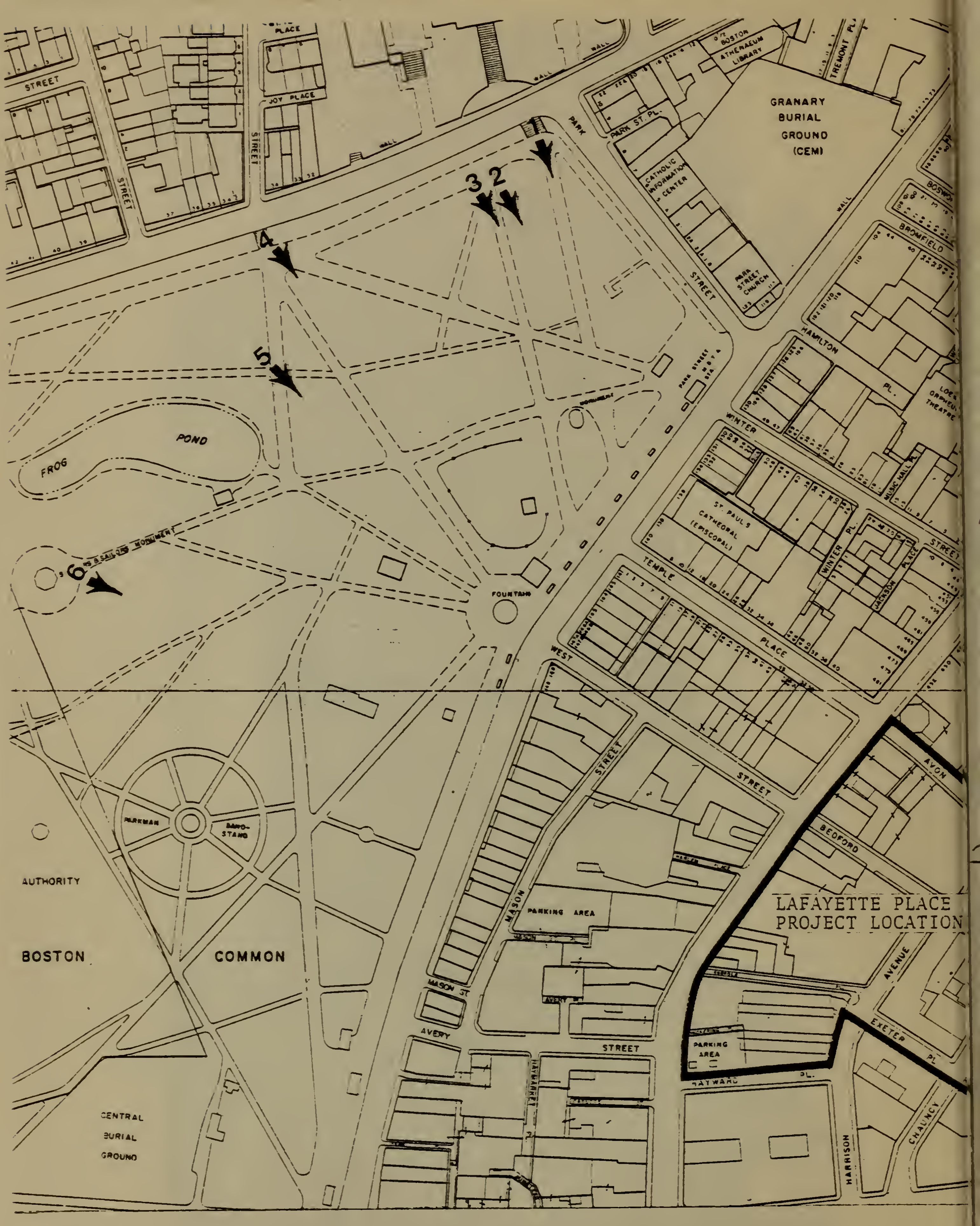


Figure D.3: Reference Map for Figures D.1 - D.2

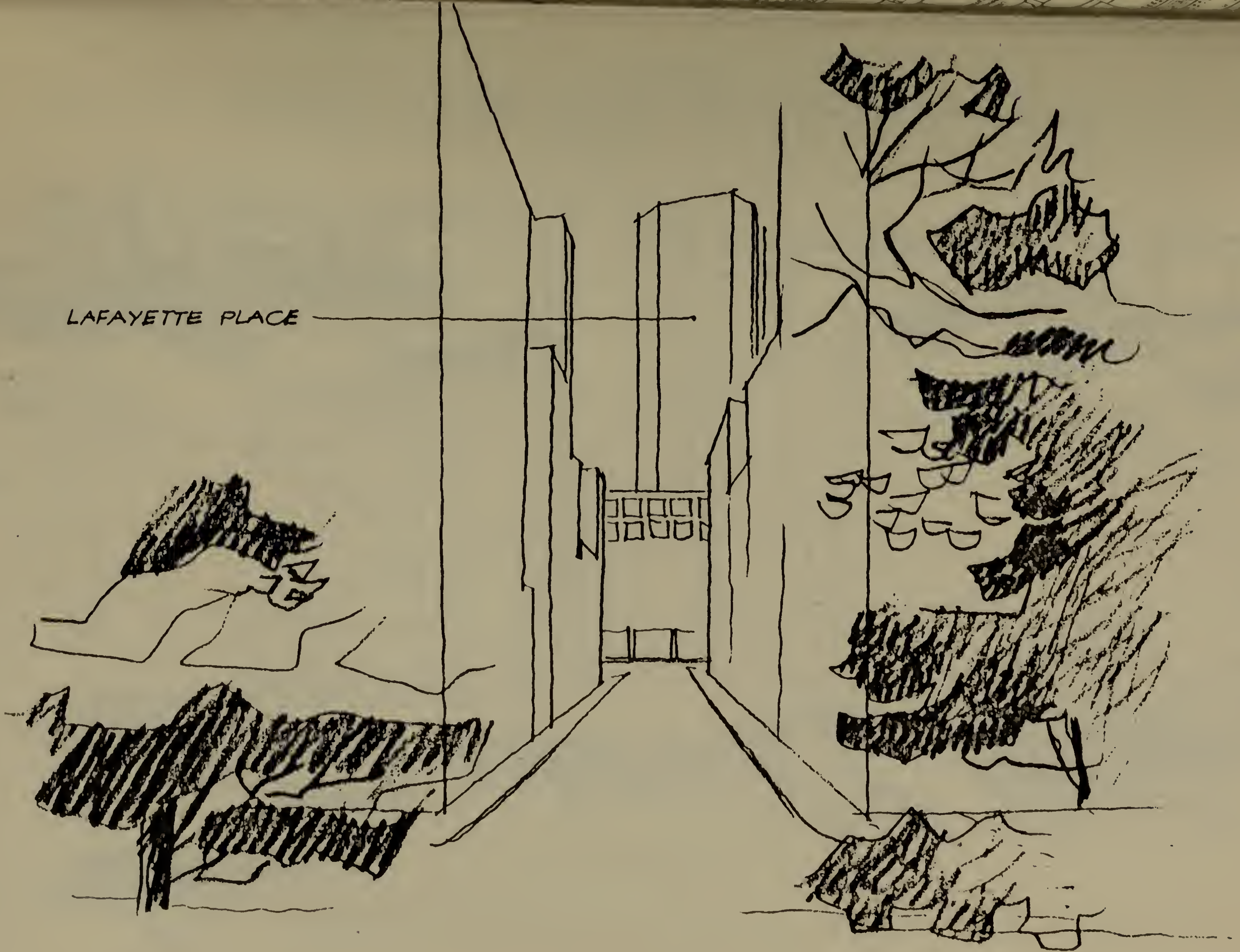


Figure D.4: View of Lafayette Place Project from Tremont and West Streets

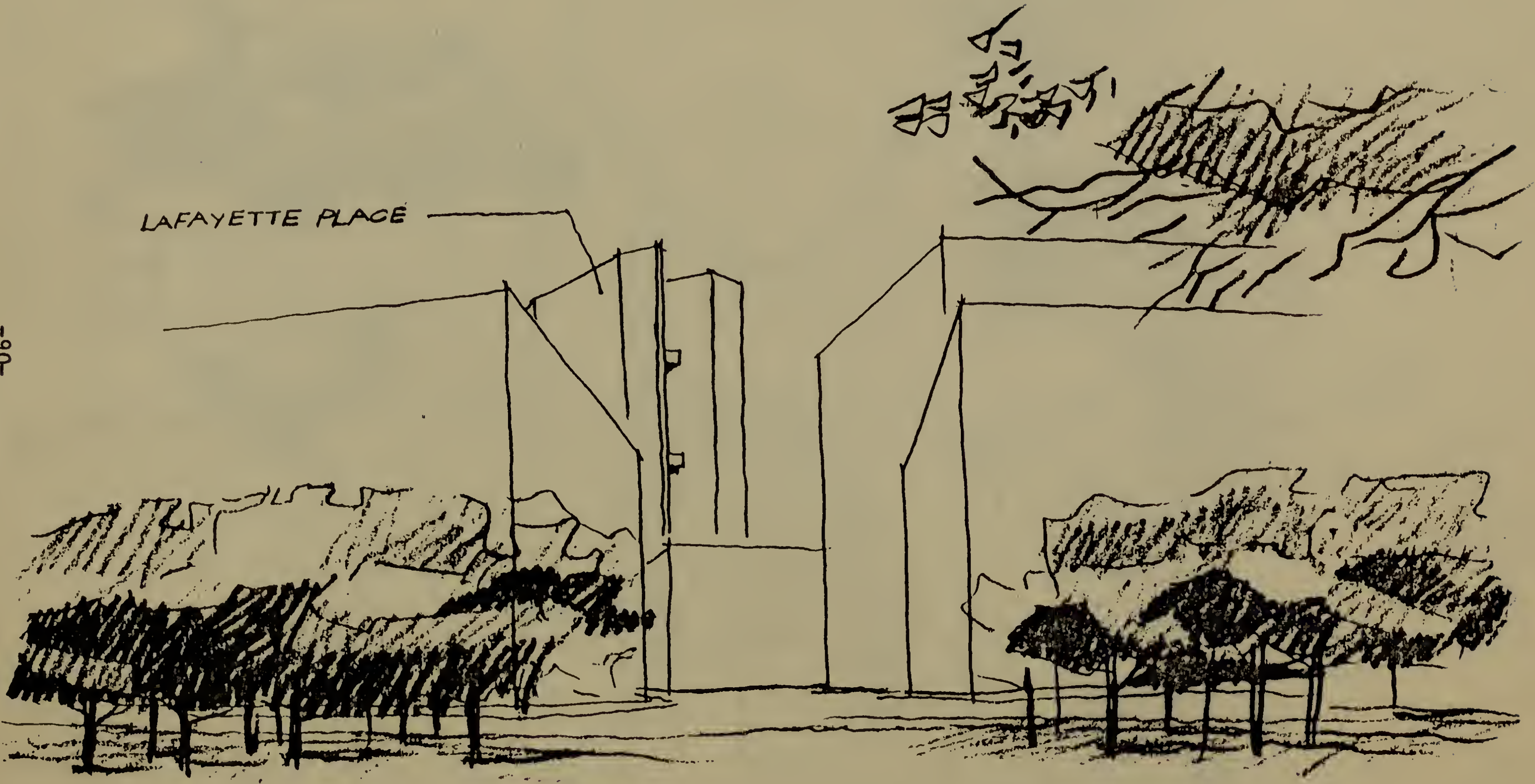


Figure D.5: View of Lafayette Place Project from Tremont and Avery Streets

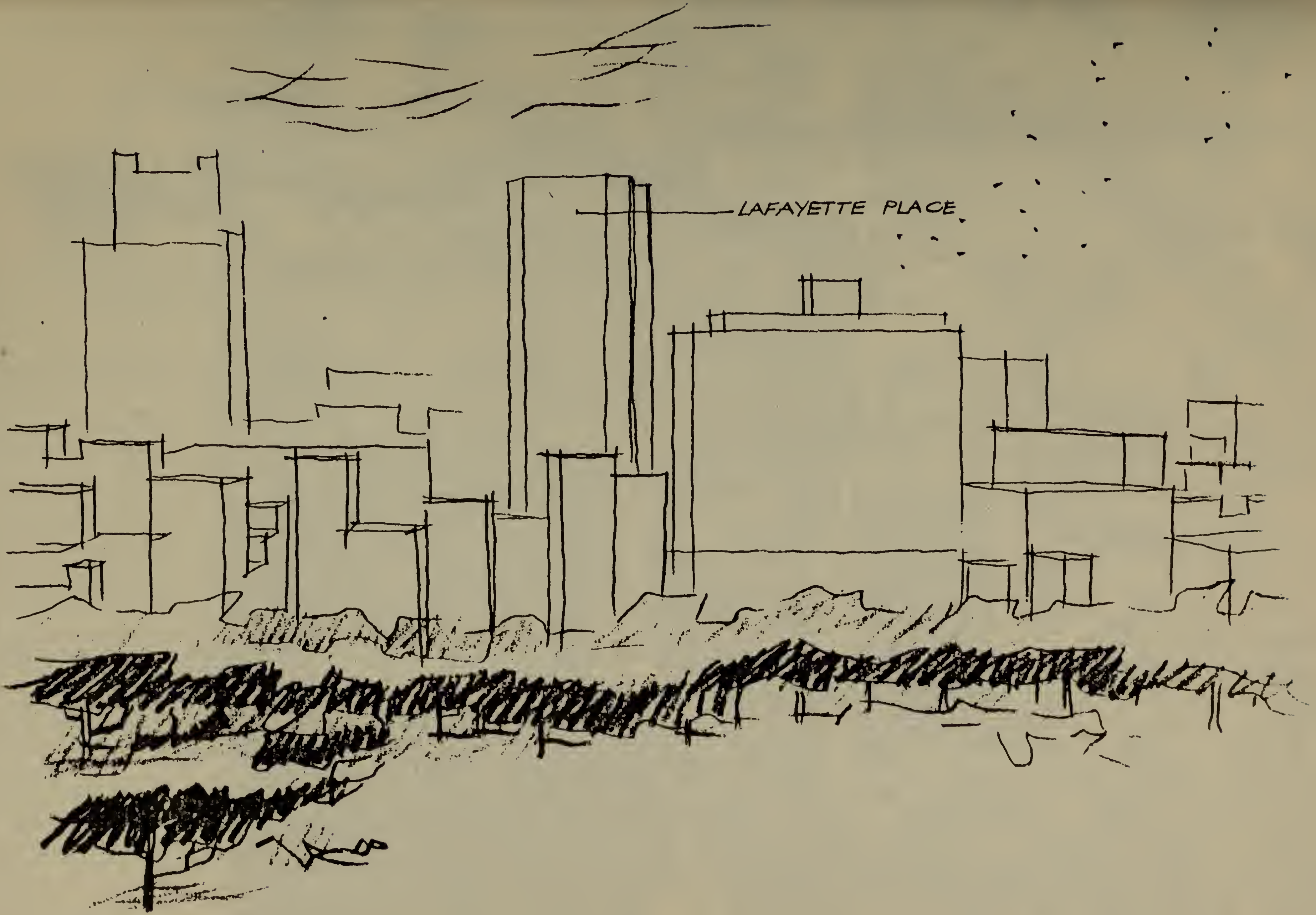


Figure D.6: Elevated View of Lafayette Place Project from Beacon Street End of the Boston Common

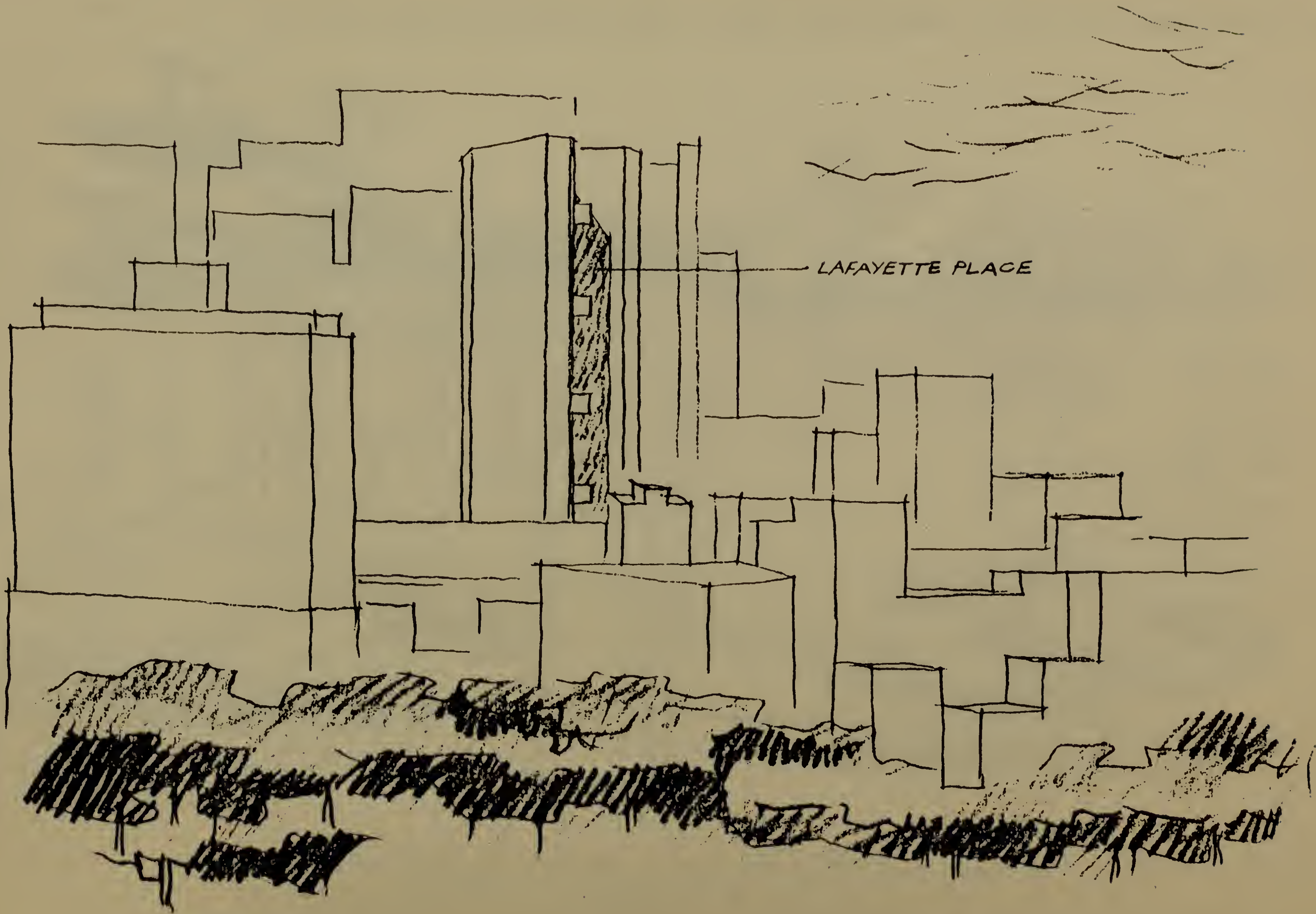


Figure D.7: Elevated View of Lafayette Place Project from Charles Street End of the Boston Common

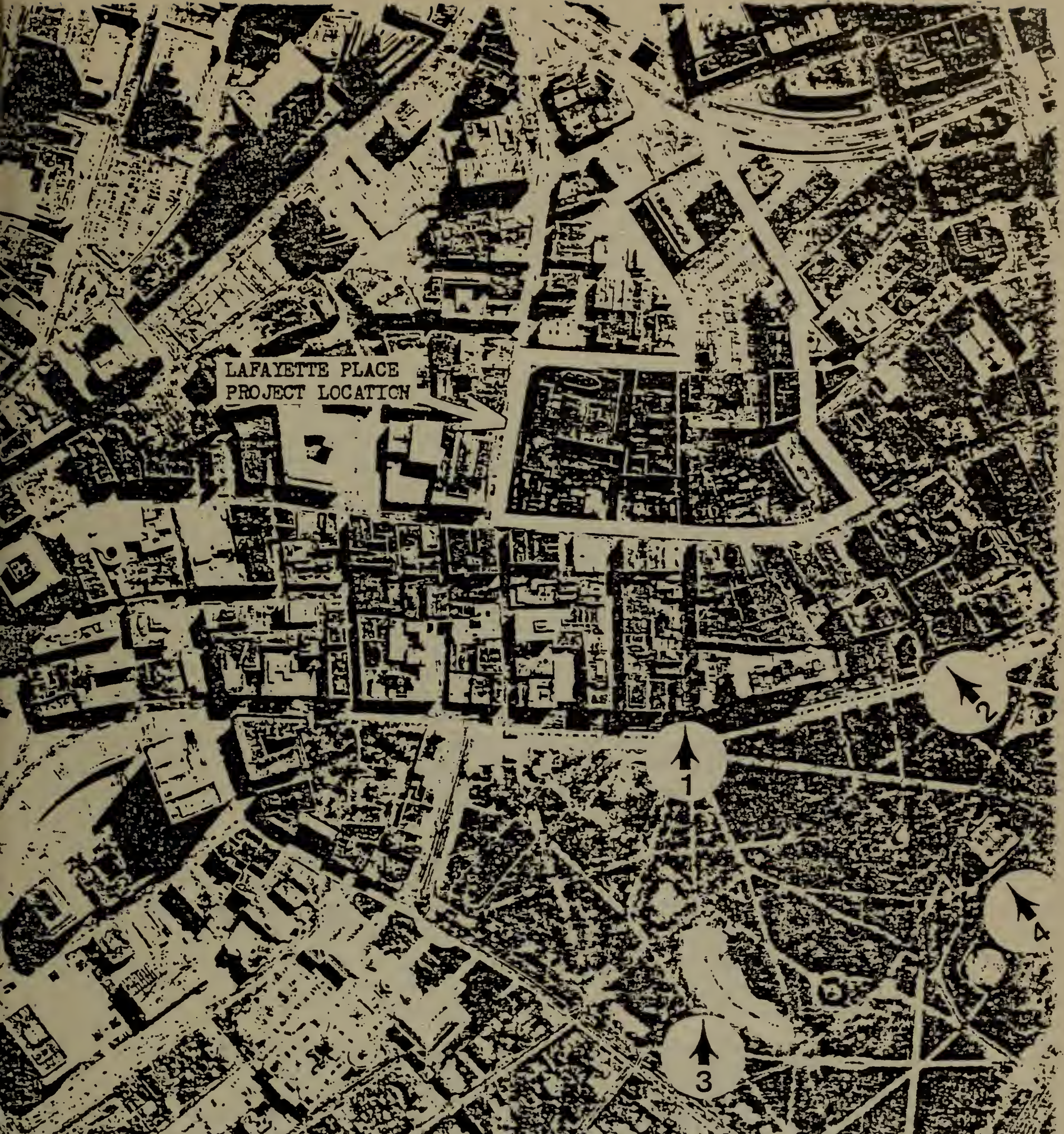


Figure D.8: Reference Map for Figures D.4 - D.7

Because of the setback of the hotel tower within the project itself (some 800 feet distance from the Common), no visual bariers should be created. (Rather, buildings such as the 25-story Tremont-on-the-Common apartment on Tremont Street have a considerably greater potential for blocking in the Common.)

3. Air monitoring program

See response to EPA comment #1 above.

4. Transporation network

a. Permanent implementation of the TTIP:

The City is firmly committed to the permanent implementation of an auto-restricted zone in downtown Boston. The one-year demonstration grant has included adequate testing of all operational components to insure that the final plan is workable and environmentally acceptable. Although quantitative data are not yet available for evaluation of the traffic, delivery, taxi and pedestrian components, initial operating experience seems to indicate that the current scheme will remain permanently, with only minor changes to signs and parking restrictions. As regards the immediate vicinity of Lafayette Place, "the current scheme" can be defined to mean: 1) restriction of private auto traffic on Washington Street between Bedford and Milk Streets, Winter Street, and Summer Street between Washington Street and Kingston-Otis Streets, 2) northbound Chauncy-Arch Streets with an exclusive reverse bus lane between Franklin Street and New Essex Street, and 3) an exclusive bus lane on New Essex Street, should it be required for continued MBTA bus service.

In terms of the bus routes, the MBTA made a commitment to continue operating the extended routes as long as their service standards for ground transportation are met. These standards require that revenues meet 30% of operating costs for the MBTA to continue running the service.

b. Altertatives to discontinued TTIP elements:

As stated above, current operational data and City policy is to continue the TTIP traffic changes permanently, with only minor signing and signal changes to improve operations. For this reason, no major alternatives to the TTIP pattern are being considered at this time. Should any alternative traffic patterns be considered in the future, however, the access needs for Lafayette Place will be taken into account, as they were in the design of the current scheme.

c. Alternative circulation patterns considered for Lafayette Place and TTIP:

(1) Lafayette Place alternatives:

Since planning for Lafayette Place preceded planning for the TTIP, original circulation alternatives did not assume implementation of an auto-restricted zone. In addition, the original alternatives were based upon a garage located between Chauncy and Columbia Streets.

Barton-Aschman Associates developed a circulation plan for the project in 1974, described as follows:

> The recommended circulation system has been designed to meet the project requirements with minimum disruption to traffic on the existing street system. The plan is also compatible with the ultimate downtown system developed by the Boston Redevelopment Authority (BRA). The most important elements of the proposed circulation system are as follows:
>
> 1. A new three-lane westbound street has been recommended that would run parallel to Essex Street between Central Artery and Kingston Street and then follow the general alignments of Rowe Place, Exeter Place, Hayward Place, and Avery Street, terminating at Tremont Street. As a result of the new street the road network would have sufficient capacity in a westerly direction. The need for this new street was based on four criteria:
>
>   a. One of the earlier comprehensive planning studies (conducted for the BRA in 1967) recognized the need for this street as a "penetrator" route across the downtown due to the development of downtown Boston as a major retail, business, and office complex by 1985.
>
>   b. Detailed traffic assignment and capacity analysis, conducted as a part of this study, clearly indicated such a street would result in significant improvement to the operation of critical intersections in the Boston CBD.
>
>   c. The new street would constitute the most logical and comprehensible westbound counterpart of Essex Street and, thus help establish a much needed east-west corridor for the Boston CBD.
>
>   d. The new street would ensure proper circulation around the project site for vehicular traffic.
>
> 2. It was assumed that Chauncy Street would be operated initially as a three-lane southbound street and ultimately as a four-lane northbound street. The recommended

circulation plan is flexible enough to be adopted to such major street modifications and is compatible with the future total development of the downtown as a single entity.

3. In order to improve the traffic operations at the intersection of Tremont and Boylston Streets, one westbound lane should be added to Boylston Street, west of the intersection. A study conducted in 1969 for the BRA indicated that the addition of such a lane is feasible, although it will require special reinforcing of the MBTA tunnel located below.

   The operation of this intersection may be improved further by the addition of a special right-turn lane, about 300 feet long, from Tremont Street onto Boylston Street.

Parking

1. It is estimated that the new development would require 3,000 parking spaces.

2. The proposed parking garage would accommodate 2,000 vehicles. It is assumed that this garage would be used to accommodate the total demand of the retail and hotel complex (1,400 and 350 spaces, respectively) and a limited portion of the office needs (250 spaces). The additional 1,000 spaces required for office parking could be obtained from existing surplus spaces.

3. The parking garage site has been strategically located with respect to the Central Artery, between Bedford Street and Rowe Place-Exeter Place. It is immediately contiguous to the project site so that it would be identified as a part of the total development.

Other Recommendations

1. The proposed South Station project will have a significant impact upon the downtown street system. An early implementation of the recommended circulation scheme would help minimize the traffic problems associated with the South Station project.

2. In the context of the Lafayette Place project, it is desirable to keep the South Street on-ramp open to traffic. However, the ramp presents some critical traffic problems with respect to the ultimate BRA objectives for the downtown.

3. Truck access and parking along these important circulation streets must be prohibited during the peak hours to ensure smooth traffic flow: Tremont Street, Washington

Street, Chauncy-Arch Street, Stuart-Kneeland Street, Essex-New Westbound Street, and Summer-Winter Street.[1]

This study considered a range of alternative circulation plans, described in Attachment D.6. The preferred alternative at that time called for:

1) New westbound Essex Street, 33 feet wide, from the Surface Artery to Tremont Street via Exeter Place, Rose Place, Hayward Place and Avery Street.

2) Widening of Chauncy and Kingston Streets between New Essex and Bedford to service the garage.

3) Closure of Avon and Bedford Streets between Chauncy and Washington to create a development parcel.

4) Eastbound Bedford Street between Chauncy Street to Church Green.

5) Implementation of Washington Street Mall: reduction of the roadway to one moving lane and one loading lane.

6) Northbound Chauncy-Arch to compensate for reduction of capacity on Washington Street.

It can be seen from the above that the circulation plan chosen for the current project design is consistent with this plan, given (1) implementation of the TTIP, (2) the change in the size and location of the garage and (3) the design to reduce land takings for the creation of the new arterial street, as discussed in the Alternatives section of the Draft EIS.

(2) TTIP alternatives

The process of alternative selection for the TTIP, (originally known as Auto Restricted Zone), is described in the draft Evaluation Plan prepared for the U.S. Department of Transportation, Transportation Systems Center, by Cambridge Systematics, Inc. (August, 1978). This description is included in Attachment D.7.

The current alternative was selected for implementation because it maximized the project goals, was operationally feasible, and was acceptable to affected merchants. A public hearing on the project was held by the BRA on January 5, 1978, at which no negative testimony was presented.

It also should be noted that the TTIP proposal was determined by the Executive Office of Environmental Affairs on May 22, 1978, as not in need of an Environmental Impact Report. In addition, a Negative Declaration submission was made to UMTA on January 25, 1978, and UMTA grant approval was given by letter June 23, 1978.

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[1] Barton-Aschman Associates, Site Analysis: Parking and Circulation Plan for Lafayette Place, 1974, pp. v and vi.

5. Coordination of construction phase impacts

Several major projects in the vicinity of Lafayette Place are either planned or underway and could be in the construction phase simultaneously with the Lafayette Place development. The major redevelopment in the immediate area is the proposed Park Plaza Project, for which planning for the State Transportation Headquarters Building and the Lex Hotel are underway. Further development in the area includes the Tufts-New England Medical Center expansion, the Music Hall expansion, and the T-NEMC Nutrition Center. Other potential development at the same time could occur in the South Station Renewal Area and on the remaining undeveloped Urban Renewal parcels abutting Stuart Street in the South Cove Urban Renewal Area.

For the Park Plaza project, the Authority has established a Design and Construction Phase Review Team to review various design and construction activities having an impact on the environment external to the Park Plaza construction site. (The function of the D.C.P.R.T. is described in detail in Park Plaza Urban Renewal Project/Final Supplemental Environmental Impact Report, Boston Redevelopment Authority, September 1976, pp. 82-83.) In addition to these controls on the Park Place development, the Authority will work closely with all impacted neighborhoods to insure a minimum of disruption from the Lafayette Place and other development projects. The Authority will also coordinate the development activities between these neighborhoods and the various City departments, which are governed by codes and ordinances to insure compliance during the permit procedures and during construction.

B. Massachusetts Bay Transportation Authority

1. Description of public interior linkage

The Lafayette Place public interior linkage will consist of a passageway open to the public and extending from the first shopping level of Lafayette Place through the main level of the Jordan Marsh Department Store to a new entrance to the Washington Street subway station on Summer Street (see Figures D.9-D.11). This passageway, which will incorporate part of the existing circulation system in the Jordan Marsh store, is proposed to be open to the public at all hours and will provide a direct and continuous access to the subway system from the project area.

2. Washington Street subway linkage relocation

Since the redesign of the Lafayette Place project, the BRA and the developers have met with the MBTA to discuss the relocation of the project linkage to the Washington Street subway station. The MBTA thus is aware of the concept and has indicated favor to the scheme, although, as the comment points out, MBTA funding is not available for the new connection. Accordingly, the City has agreed to pay for the subway kiosk and entrance on Summer Street and will enter into all required agreements with the MBTA

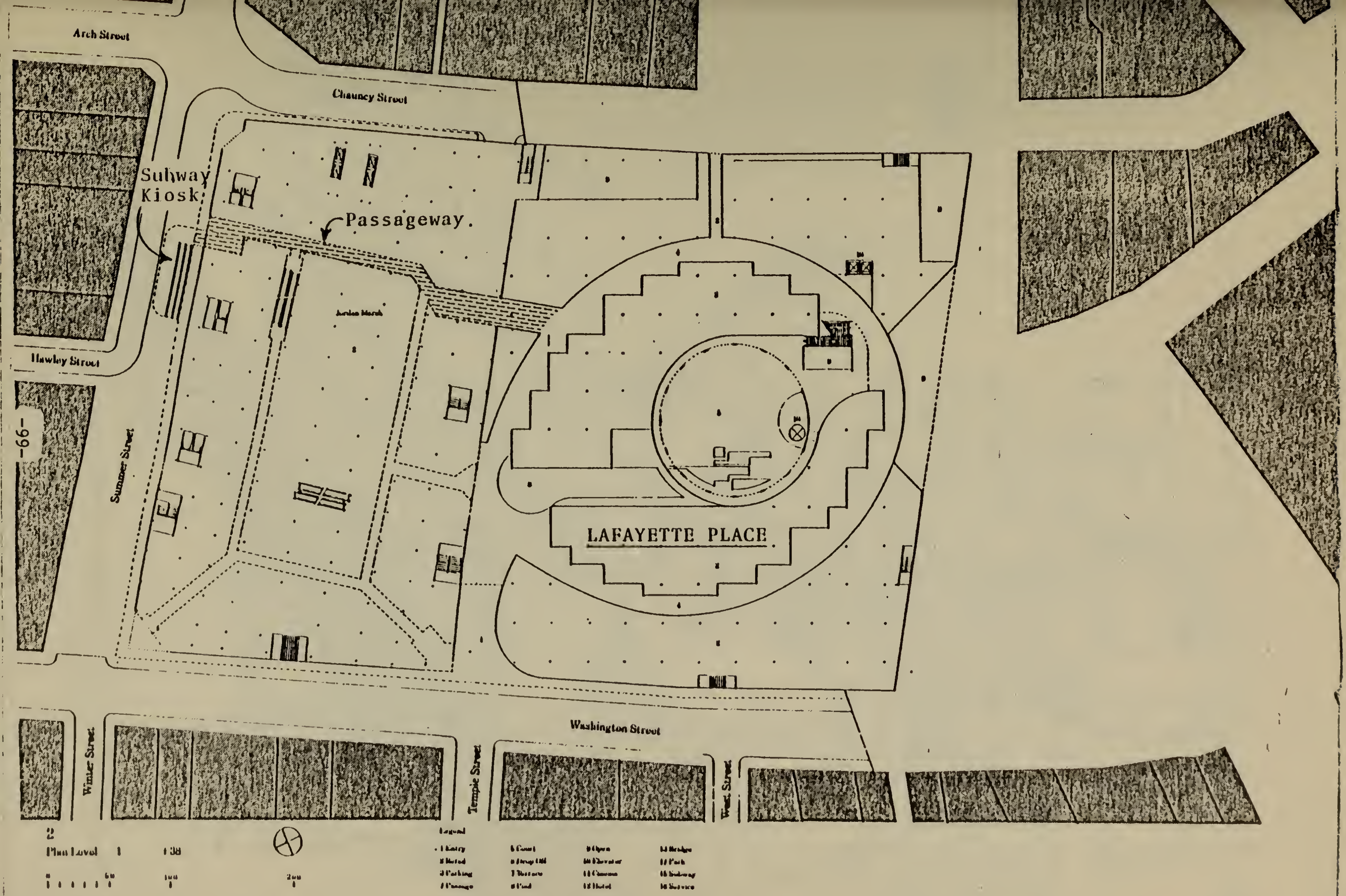


Figure D.9: Plan of Public Passageway Connecting Lafayette Place to New Summer Street Subway Kiosk

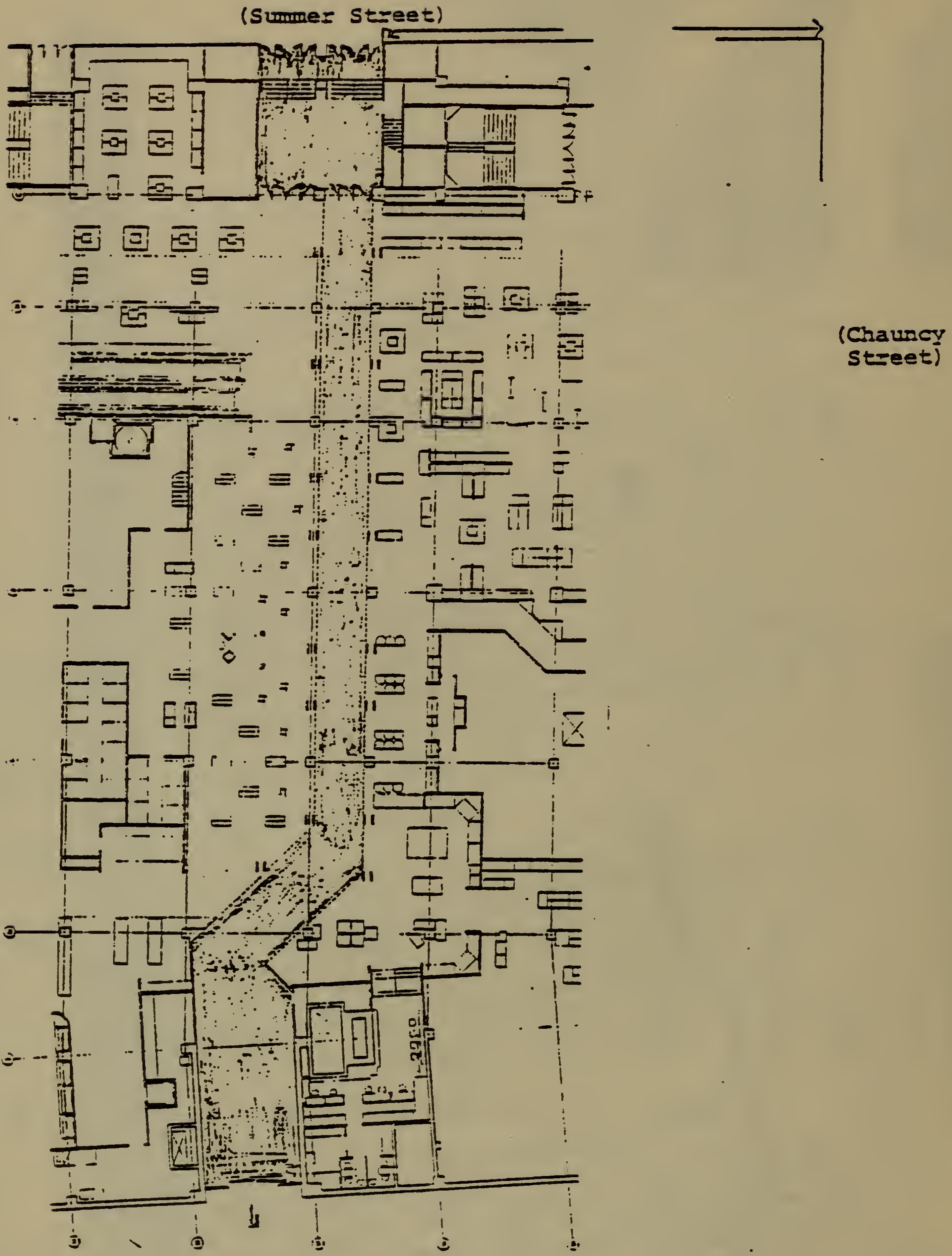


Figure D.10: Plan of Passageway through Jordan Marsh Store

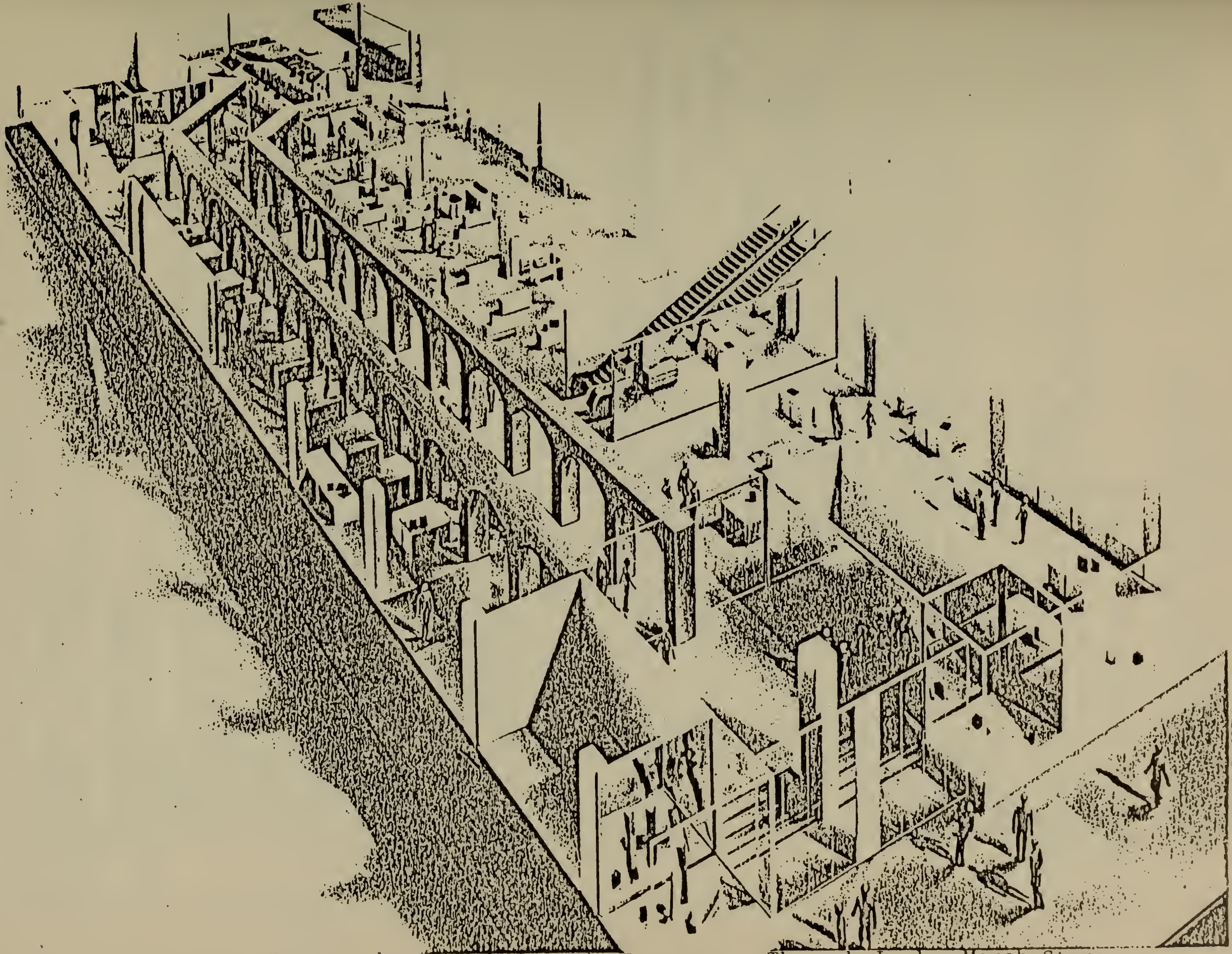


Figure D.11: Perspective View of Public Passageway Through Jordan Marsh Store

which are necessary in order to implement the project. (Article V, Section 5.04(d) of the Tupartite Agreement). Perhaps the commentor was not aware of the MBTA/BRA discussions.

3. Current plans and designs

The most recent plans and designs for the Lafayette Place project and interconnections to the MBTA system are shown on Figures B.1-B.13 and Figures D.9-D.11 above.

4. MBTA system partronage

According to the 1977 Annual Report of the MBTA, the average weekday ridership on commuter rail, rapid transit, streetcars, buses and trolley buses rose 3.7 percent in 1977, from an estimated 513,400 one-way passengers each weekday in 1976 to an estimated 532,300 one-way passengers each weekday in 1977. New vehicles (the Light Rail Vehicles), a new station on the Haymarket North extension of the Orange Line, the commuter rail alternative to driving, and improvements to the MBTA Pass Program were considered the principal reasons for the increase. The year 1977 was the second consecutive year in which MBTA ridership increased.

5. Rapid transit network

A revised Figure II.A.15, showing the completed Orange Line extension to Oak Grove, is attached. (In addition, the Lexington Line of the commuter rail network is not in service at this time, and a revised Figure II.A.16 is attached.)

6. Rapid transit system update

The updated information regarding the Orange Line, Red Line, and Blue Line contained in the comments is noted and incorporated herein by reference. The following additional corrections have been supplied by the MBTA.

Orange Line

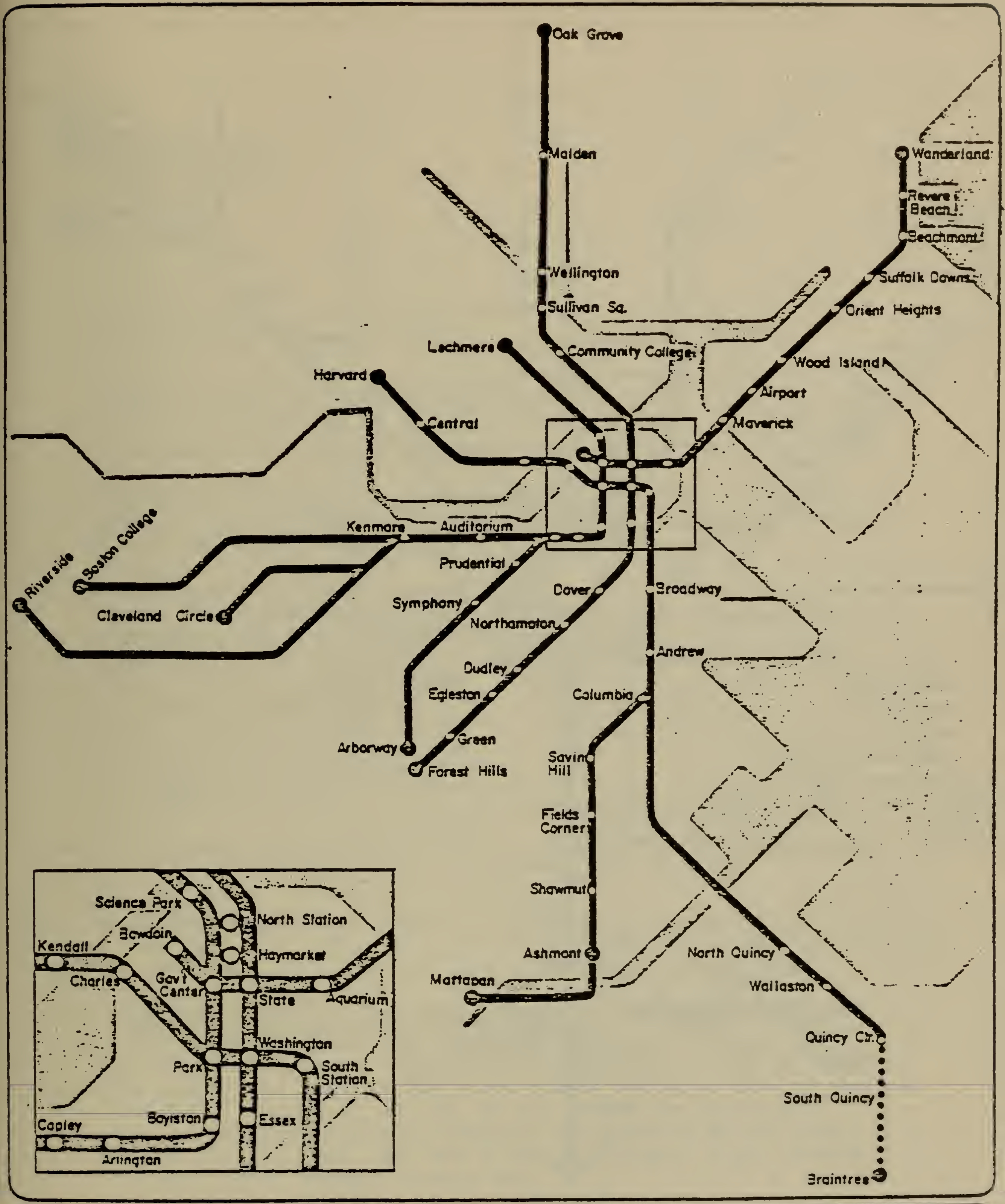
Under current operating conditions, the 3.5 minute frequency occurs during rush hours only. The Orange Line presently has 90 vehicles, with 72 needed for service.

Blue Line

Current headway during the P.M. peak is 4 minutes. The Blue Line currently has 70 new cars and a small number of old cars, with 40 vehicles operating in the morning hours and 44 in the afternoon.

Commuter Rail Services

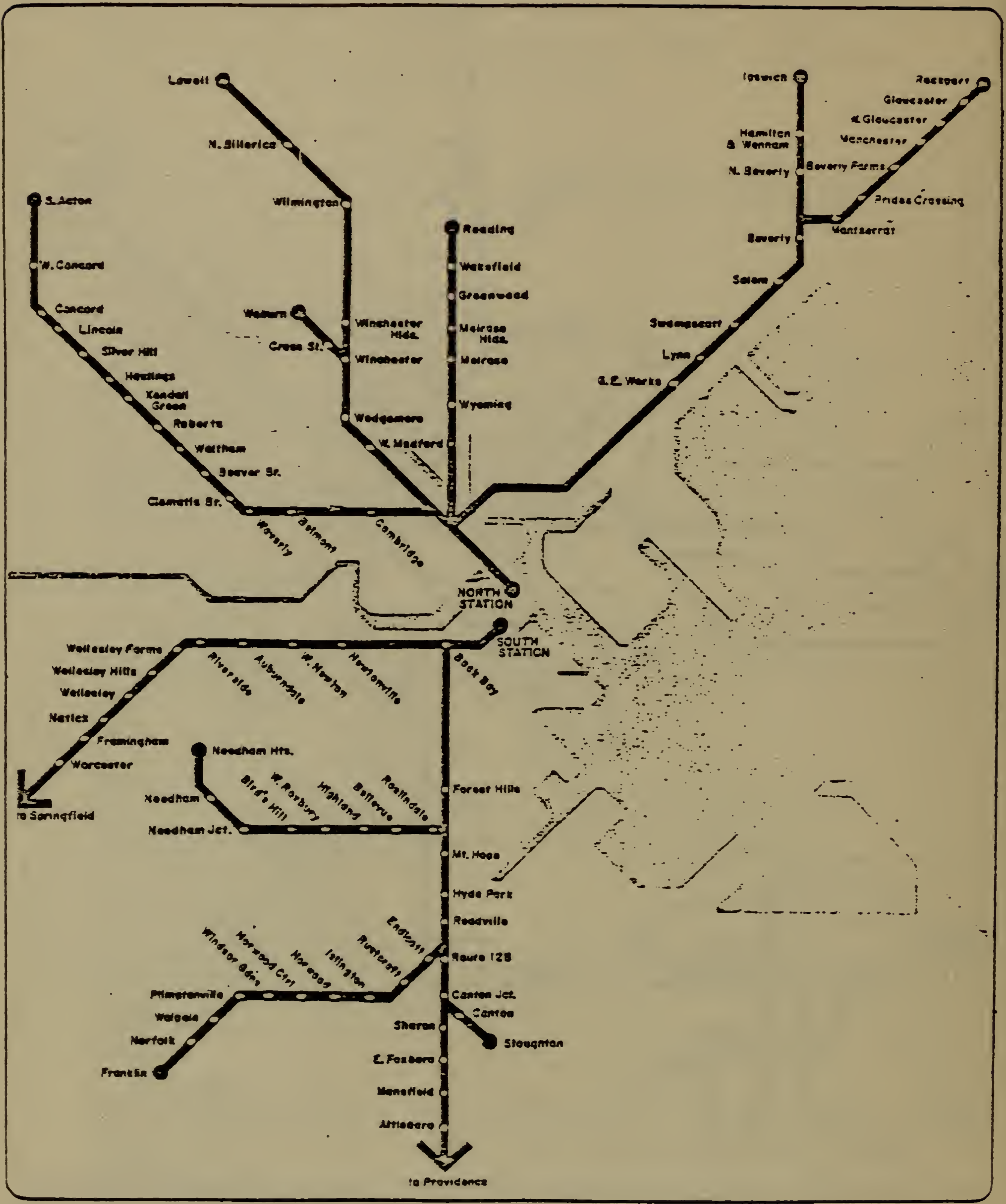
As of June 1978, the following number of trains were operated on the commuter rail network.



1978 Rapid Transit Network

no scale

Figure: II.A.15 (Rev.)



1978 Commuter Rail Network

no scale

Figure: I.I.A.16 (Rev.)

	Weekdays	Saturday	Sunday	Estimated Daily Passengers (8/78)
North Service (Boston & Maine)	246	136	92	8,200
South Service (Penn Central)	107	34	0	6,600
Total	353	170	92	

7. TTIP proposal and bus service

a. "Downtown Crossing" is the current (October 1978) name for the Boston Transit and Traffic Improvement Program, which has had several name changes during its short existance. The TTIP was the current name at the time of the publication of the Draft EIS.

b. The TTIP did not begin operationally until September 5, 1978, some two months after the preparation of the Draft EIS. Therefore, use of the future tense in the Draft EIS was correct.

c. As part of the Transit & Traffic Improvement Program demonstration grant, the following MBTA bus routes have been extended into the downtown area to supplement the current transit access via the subway:

From Charlestown	Routes 92 and 93, Bunker Hill and Main Street buses
From South End	Routes 49, 43 Tremont Street and Northampton-Washington Street buses
From South Boston	Routes 7, 11, Summer Street and Bayview buses
From the western suburbs	Express buses 300, 301, 304 305 from Riverside, Brighton Center, Watertown and Waltham.

These bus routes are the same as described on Page 88 of the Draft EIS (the express bus routes have been in operation for several years); some modifications to the routing, however, have been made. At present, the buses run in two loops through the downtown. Routes 11, 43, 49, 92 and 93 use the Washington, Milk, Devonshire, Franklin, Chauncy and Bedford Streets loop. Routes 300, 301, 304, 305, and 7 use the Summer, High, Federal, Franklin, Arch, Summer Streets loop.

8. Transit car capacities

The number of riders per car for each transit line, as identified in the comment, is incorporated herein by reference. Green Line capacity is 130 rides on the PCC cars and 220 persons on the new light-rail vehicles.

9. Increased service on Orange and Blue Lines

MBTA's commitment to replace the existing vehicles on the Orange and Blue Lines with new vehicles is welcomed. New vehicles, together with improvement of service, should help to accommodate adequately increased ridership as a result of the Lafayette Place project.

10. TTIP proposal update

See response to comment #7 above. The most current TTIP ("Downtown Crossing") map is attached as Figure D.12.

11. Competition for Lafayette Place retail development

Although it is recognized that Boston retail centers such as Quincy Market and the Back Bay will offer competition to Lafayette Place, they would not directly affect changes in suburban shopping patterns as a result of the Lafayette Place development, which was the purpose of the discussion in this section of the report. A careful reading would show that this discussion refers to the potential influence area of the Lafayette Place project and its anticipated effect on regional shopping centers, as they relate to drawing customers away from suburban retail developments to the Central Business District of Boston. It is recognized that projects such as Quincy Market and the future Copley Place development in the Back Bay also do and will affect regional shopping patterns and tend to draw shoppers to Boston, as will Lafayette Place.

12. Additional MBTA capacity

Any additional equipment that the MBTA can add to its lines will certainly help to provide adequate capacity for projected increase ridership.

13. Daily transit ridership

The additional transit-riders generated for the entire day from the Lafayette Place project (retail and hotel components and the addition of 100,000 square feet of office space) is estimated as follows:

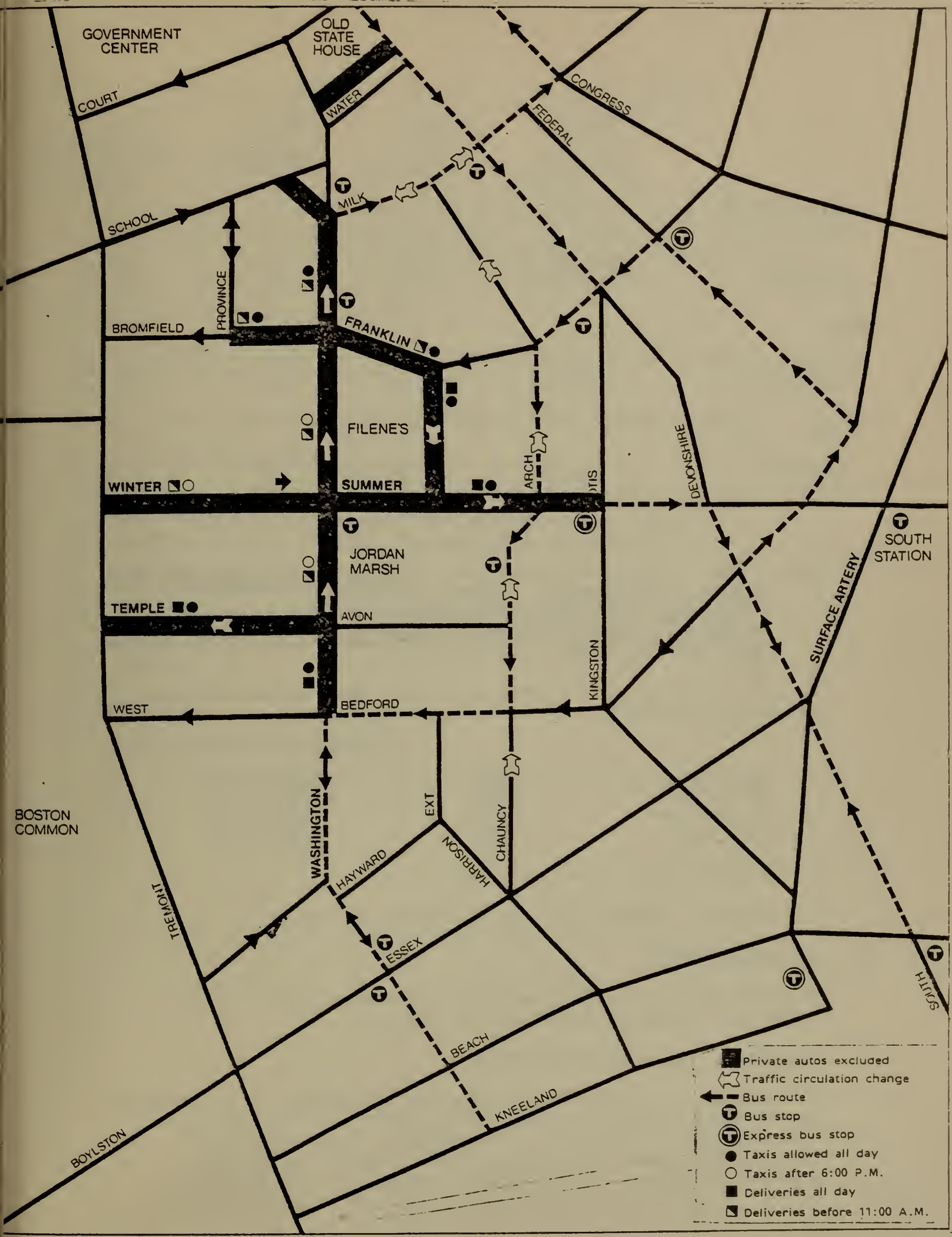


Figure D.12: "Downtown Crossing" Circulation Plan

	Person Trips/ Unit Size	Total One-Way Trips/Day	Modal Split to Transit	Daily One-way Transit Trips
Lafayette Place Retail				
- shoppers	35/1,000 s.f.	21,000	50%	10,500
- employees	5/1,000 s.f.	3,000	75%	2,250
Hotel				
- visitors/guests	4.8/room	4,800	30%	1,440
- employees	1.2/room	1,200	40%	480
Office				
- employees	4.2/1,000 s.f.	840	50%	420
- visitors	1.1/1,000 s.f.	220	50%	110
		31,060		15,200

Sources: Barton-Aschman Associates, Inc., Site Analysis - Lafayette Place, Boston, Massachusetts, prepared for SEFRIUS, Developers, Washington, D.C., July 1974; Wilbur Smith and Associates, An Access Oriented Parking Strategy for the Boston Metropolitan Area, Boston, 1974.

Distribution of the transit trips to the four rapid transit lines is estimated as follows:

Red Line	(40%)	6,080 trips
Green Line	(25%)	3,800 trips
Orange Line	(35%)*	5,320 trips
Blue Line	(10%)	1,520 trips

* Includes Blue Line patronage

Source: Wilbur Smith and Associates, op. cit.

14. Red Line vehicles

The information regarding use of 6-car trains on the Red Line is noted and is incorporated herein by reference.

15. Washington Street tunnel extension

The statement in the Draft EIS regarding the opening of a Washington Street tunnel from Essex Street to the Lafayette Place project was based on earlier proposals for the project. The current MBTA modernization plans do not include this tunnel nor is funding presently available. The possibility of opening a tunnel in the future, however, is not foreclosed and may be seriously considered as additional planning and design for the project progresses, especially if the Hayward Place garage site is redeveloped.

16. Orange Line vehicles

While there are no immediate plans to use 6-car trains on the Orange Line, station development and modernization along this line will accommodate their use in the future. It is currently anticipated that 6-car trains will be added to this line when its relocation to the Southwest Corridor is completed in the mid-1980's.

17. Accurate and updated statistics

Accurate and updated statistics as supplied by the MBTA are incorporated into the above responses.

C. Water Resources Commission, Division of Water Pollution Control

1. Adequacy of existing sewer system

A letter from the Boston Water and Sewer Commission respecting the adequacy of the existing sewer system in the Central Business District of Boston is appended as Attachment D.8.

2. Sewer extention permit

Application for a sewer extension permit will be filed with the Division of Water Pollution Control prior to construction of the project.

Local Agencies

A. Boston Landmarks Commission

See response to Advisory Council on Historic Preservation letter above.

Attachment D.1

TECHNICAL MEMORANDUM (Exerpts)

Air Quality, Noise and Wind Measurements in Support of the Boston Downtown Freedom Mall Project

K. M. Chng and P. A. Gardner

August 1978

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1.0 INTRODUCTION

1.1 Study Objective

The objective of this study is to measure the environmental impact -- as manifested in changes in the ambient levels of carbon monoxide, oxides of nitrogen, and noise -- associated with the changes in motor vehicle traffic due to construction of the Downtown Freedom Mall.

1.2 Scope and Approach

The parameters that were monitored included carbon monoxide (CO), oxides of nitrogen (NOx), wind speed, wind direction, and noise. The approach used for measuring these parameters are described below.

Carbon Monoxide. A non-dispersive infrared (NDIR) analyzer and 3 ecolyzers were used to measure the CO. The NDIR is an approved EPA method for long-term continuous ambient monitoring. The ecolyzers, which are based on electrochemical methods, were used for the additional site coverage.

Oxides of Nitrogen. Both nitric oxide (NO) and nitrogen dioxide (NO_2) were measured using an EPA approved method involving chemiluminescent techniques for continuous measurements.

Wind Speed and Direction. Both wind speed and direction were recorded on a continuous basis using monitoring and self-recording instrument such as the Climatronics Electronic Weather Station and the MRI Mechanical Station.

Noise. Noise was monitored on a continuous basis using BBN's automatic Model 614 monitoring system.

The monitoring program covered a period of approximately two weeks -- form the first to the last week of July.

Section 2 of this memorandum summarizes the methods used to collect the data. The discussion is grouped into site selection, probe placement, monitoring equipment, calibration, and data reduction. The results of the monitoring program are presented in Section 3. Examples of measured results for each of the different monitoring equipment are given in Appendix A, the hourly average values are tabulated in Appendix B, and performance specifications of the various types of equipment are given in Appendix C.

2.0 METHODS

2.1 Site Selection

A total of 4 measurement sites were selected for monitoring. The selection was based on a number of considerations including 1) severity of existing traffic conjestion problem; 2) anticipated changes with the implementation of the Downtown Freedom Mall; 3) proposed bus routing; and 4) availability and accessibility of of the site.

The location of these chosen sites, the selection criteria, the parameters measured, and the associated instrument deployed, are shown in Table 2.1. The geographical locations of these 4 sites are shown in Figure 2.1.

2.2 Probe Placement

Probe location for air sampling followed established EPA guidelines. Summary descriptions of probe location and sensor placement for each site are given below.

The Post Office Cafeteria Site. Air samples were drawn in by a manifold system at approximately 15 feet from street level and 3 feet from the wall. Individual air intakes from manifold to the NDIR and the ecolyzer were affected by 3 to 6 ft. tygon tubing. The microphone for the noise monitor was mounted on a boom extending between 6 and 7 ft. from the window. The electronic wind sensor was mounted on a separate boom and extended approximately 7 feet from the wall and was relatively free from wind effects and from nearby objects.

TABLE 2.1

Site ID No.	Site Description	Selection Criteria	Parameters Measured	Equipment
1.	Post Office Cafetaria	Maximum Impact from Conjestion	CO, Noise, Wind Speed, Wind Direction	NDIR, Ecolyzer, Noise Monitor, Wind Sensor
2.	Post Office Roof	Roof top wind	Wind Speed, Wind Direction	Wind Sensor
3.	Arch Street	Maximum Bus Impact	CO, NO/NO$_2$, Noise Wind Speed, Wind Direction	Ecolyzer, NOx Monitor, Noise Monitor, Wind Sensor
4.	Winter Street	Maximum Reduction in Auto Traffic (Auto-free)	CO, Noise	Ecolyzer, Noise Monitor

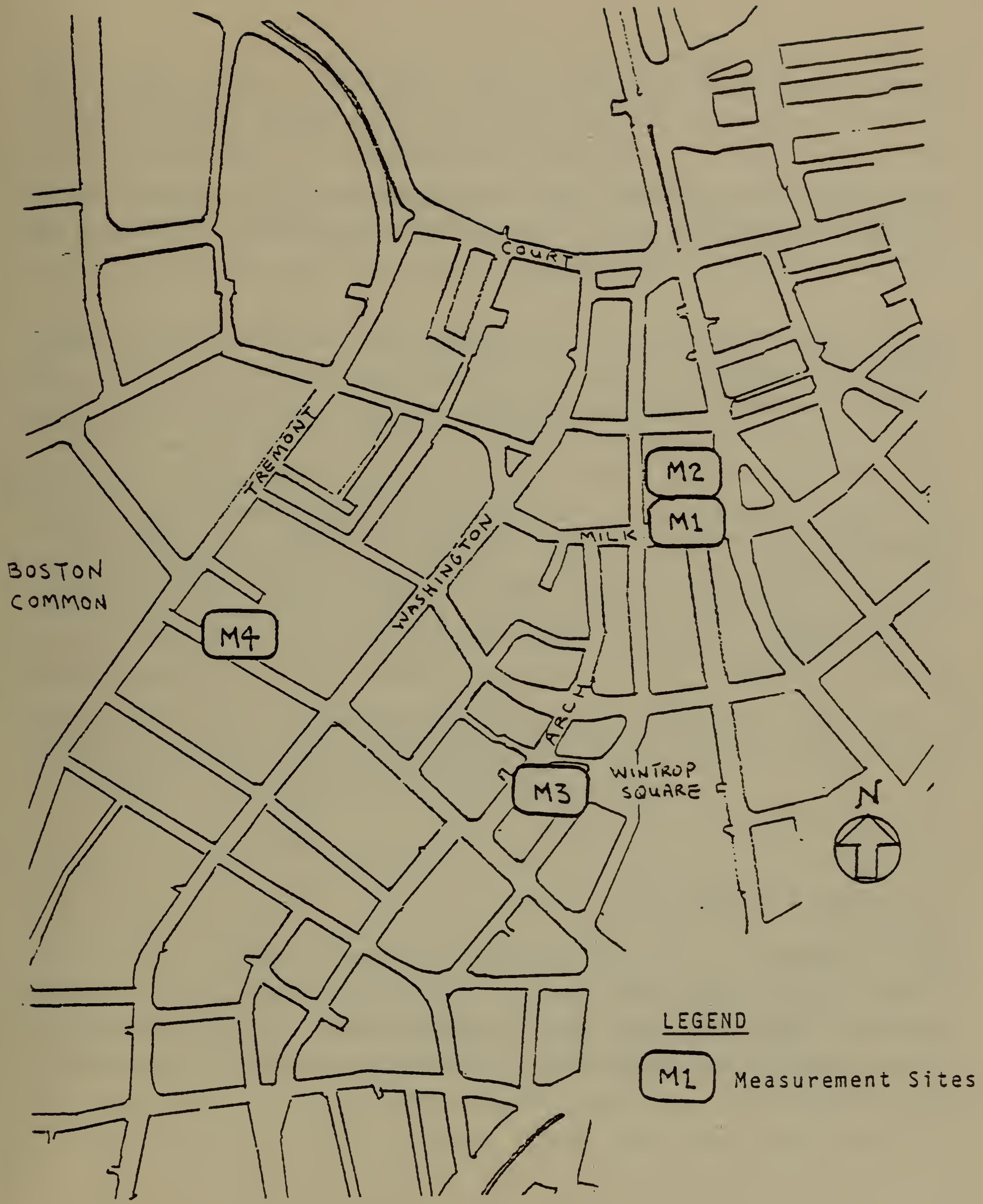

FIG. 2.1. Project Area Showing Location of the Monitoring Sites.

At the Post Office Roof Site. The wind sensor was mounted on top of a boom extending about 10 feet from the highest part of the Post Office roof. Influence from antenna structures on the roof was judged to be insignificant. With the possible exception of the Shawmut Bank Building, this site was relatively free from wind effects of nearby structures.

At the Arch Street Site. Air samples for CO were taken at approximately 12 feet above the sidewalk and 2 feet from the wall. For NO/NO_2 a separate intake was used. Air was drawn at about 25 feet above sidewalk (corresponding to the level of the window on the 1st floor) and about 8 feet from the wall. All pneumatic plumbing was made of inert teflon. The microphone was mounted on a boom extending about 8 feet out of the window. The wind sensor was mounted on its own boom and extended about 8 feet from the wall. The wind sensor was approximately 15 feet from a nearby 5 ft. protruding wall face.

At the Winter Street Site. Air samples for CO were taken at approximately 12 feet from the sidewalk and 3 feet from the wall. The microphone for the noise monitor was mounted on a boom at this height but extending about 5 feet from the wall.

2.3 Monitoring Equipment

Carbon Monoxide. CO concentrations were measured by two different types of equipment. The first is a Beckman non-dispersive infrared analyzer (Model 865 with the autospan option). The other is an Energetics Science Ecolyzer, which works on an electro-chemical principle.

Oxides of Nitrogen. Both NO and NO_2 were measured using a Monitor Labs chemiluminescent analyzer (Model 8440E). Both oxide species were recorded continuously and concurrently.

Noise. Noise levels were measured using BBN's Model 614 portable noise monitors. Average hourly noise levels along with 24-hour noise statistics were recorded automatically.

Wind. Wind speed and wind direction were measured using a Climatronics Electronic Weather Station, a Texas Instrument Electronic Wind Sensor, and a MRI Mechanical Weather Station.

2.4 Calibration and Data Reduction

Carbon Monoxide. The NDIR analyzer was programmed to automatically zero and span itself every 4 hours. The ecolyzers had to be calibrated manually twice a day -- in the morning around 9 a.m. and at 4 p.m. Because of the tendency for the ecolyzers to drift and become unstable, much of the weekend data were rejected as invalid. All CO data were recorded continuously on strip chart recorder. The charts were labelled and screened, and then digitized electronically to produce hourly average CO concentrations.

Nitrogen Oxides. Calibration of the NOx analyzer was accomplished through the use of the Monitor Lab Model 8500 PERMACAL dynamic calibration system. Calibration was performed after installation at the site, about one week into the measurement program, and just prior to the end of the program. The calibration used standard NO gas (traceable to NBS standard) which was subsequently diluted to the desired concentration during the actual calibration, and a NO_2 permeation tube. Both NO and NO_2 data were recorded simultaneously in a dual-channel chart recorder. These data were digitized to produce hourly values of NO and NO_2 separately.

Noise. The BBN Model 614 noise monitors were calibrated daily using such acoustic calibrators as B&K 4220 and GR 1567 . Hourly noise levels and 24-hour noise statistics (e.g. L_{dn}) were printed automatically on a paper tape.

Wind. Wind speed sensors were calibrated in the laboratory and no additional calibration in the field was required. Wind direction calibration was performed during installation at the site using existing landmarks. Both wind speed and wind direction data were recorded continuously on strip charts. These data were digitized to produce hourly average results.

3.0 RESULTS OF THE MONITORING PROGRAM

3.1 Carbon Monoxide

At the Post Office Site. The non-dispersive infrared (NDIR) CO analyzer deployed at this site collected data on a continuous basis from July 10, 1978 through July 26, 1978. Data capture was estimated at 96%. Highest 1-hour average was 20 parts per million (ppm) which took place at 10 a.m. on a Tuesday. Low 1-hour average readings of between 1 ppm and 2 ppm occurred quite frequently between 1 a.m. to 5 a.m. No violation of the 1-hour standard of 35 ppm was observed. The highest 8-hour average was 12 ppm, recorded on a Tuesday at 5 p.m. During this monitoring period, there were 3 occassions (of non-overlapping 8-hour time periods) for which the 8-hour standard of 9 ppm were exceeded.

Figure 3.1 shows the variation of the ambient CO levels at this site for selected days of the week. On weekdays, CO levels rose rapidly from about 7 a.m. Maximum CO levels occurred around the evening rush hour at 5 p.m. Levels on Saturdays were generally low, the evening rush hour peak was absent, and the levels remained between 4 and 9 ppm late into the night.

The CO ecolyzer that was placed next to the NDIR was operated from July 10, 1978 through July 25, 1978. Data capture rate was low -- about 65%. This was due primarily to equipment instability during unattended operation at night and on weekends. During periods of attended calibration, the CO readings on the ecolyzer corresponded fairly well with the NDIR readings.

Comments:

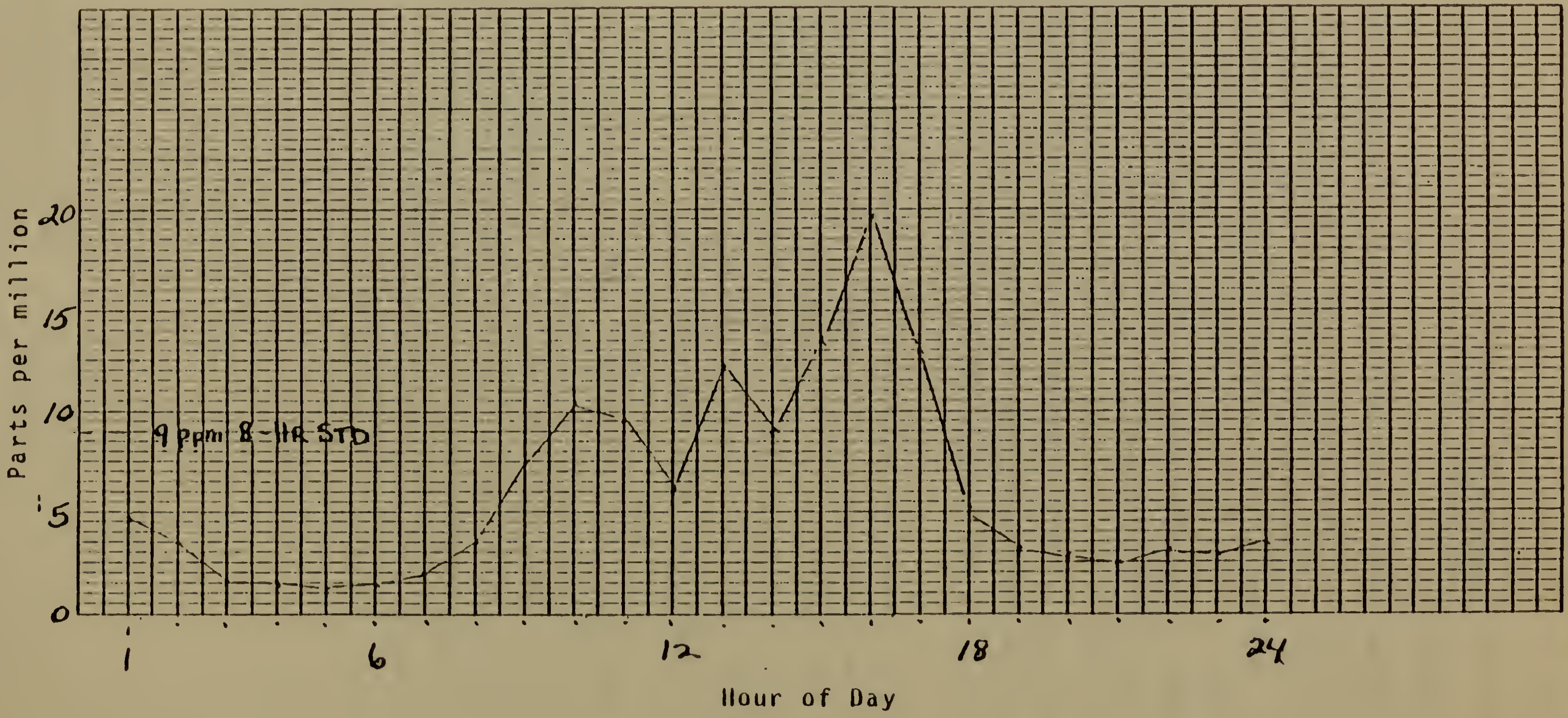

FIG. 3.1A. Measured Hourly Average Carbon Monoxide (CO) Levels at the Post Office Site on Tuesday, 7/18/78.

Comments:

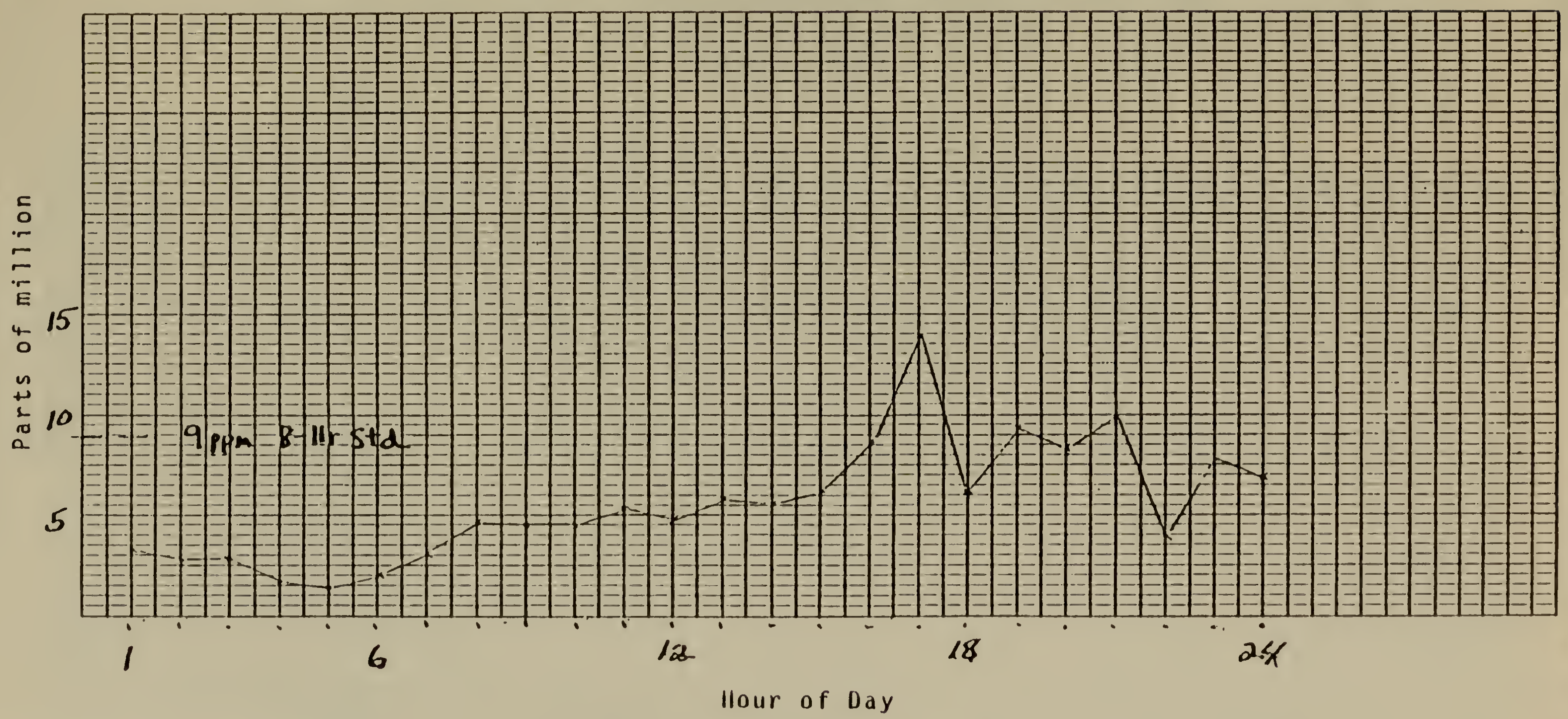

FIG. 3.1B. Measured Hourly Average Carbon Monoxide (CO) Levels at the Post Office Site on Wednesday, 7/12/78.

Comments:

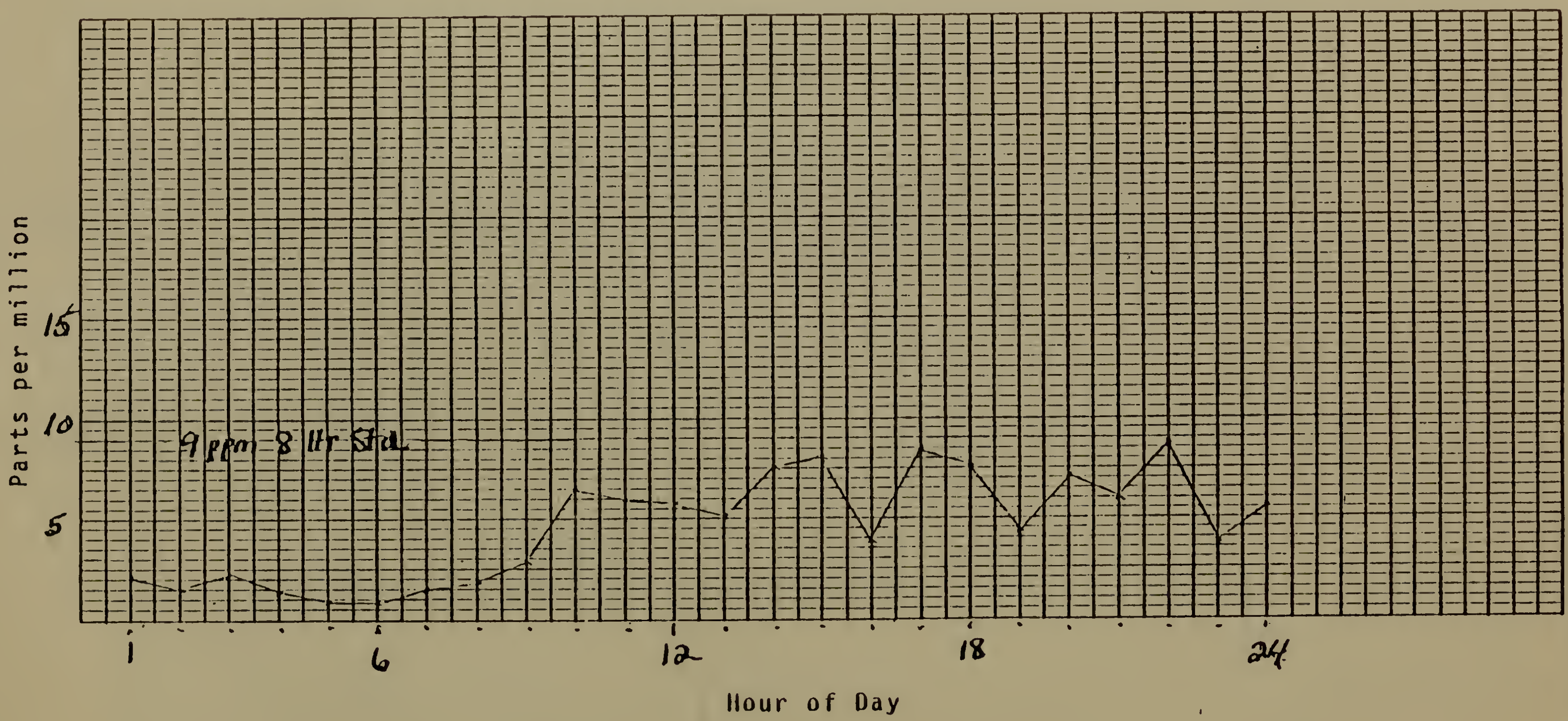

FIG. 3.1C. Measured Hourly Average Carbon Monoxide (CO) Levels at the Post Office Site on Saturday, 7/15/78.

At the Arch Street Site. A CO ecolyzer was operated from July 9, 1978 through July 26, 1978. Data capture during this period was estimated at 65%. Highest 1-hour average CO reading was 16 ppm, which took place at 6 p.m. on a Monday. Low 1-hour readings of 2 ppm or less were frequently encountered between midnight and 6 a.m.

Figure 3.2 shows the diurnal variation of CO levels at this site for a Monday and a Thursday. The CO build up in the morning was slow compared to readings taken at the Post Office Site. Maximum levels were observed at 6 p.m. No exceedance of the 1-hour standard was encountered. The highest 8-hour average found was about 7.0 ppm, which happened on a Monday between noon and 7 p.m. There were no violation of the 8-hour standard.

At the Winter Street Site. A CO ecolyzer was operated at this site from July 12, 1978 through July 26, 1978. Data capture was estimated at 50%. Highest 1-hour average CO reading was 26 ppm which took place at 6 p.m. on a Monday. During periods of traffic congestion, idling automobiles were backed up past the location of the CO monitor. However, no exceedance of the 1-hour standard was observed. Highest 8-hour average reading was 15 ppm which occurred between 2 p.m. and 9 p.m. on a Monday. There were 7 occasions of violation of the 8-hour standard of 9 ppm during this sampling period.

Figure 3.3 shows the hourly variation of CO levels recorded at this site. Compared with levels recorded at the Post Office and the Arch Street Sites, the CO levels at Winter Street were generally much higher. Maximum levels occurred both during the lunch hour and the evening rush hour.

Comments:

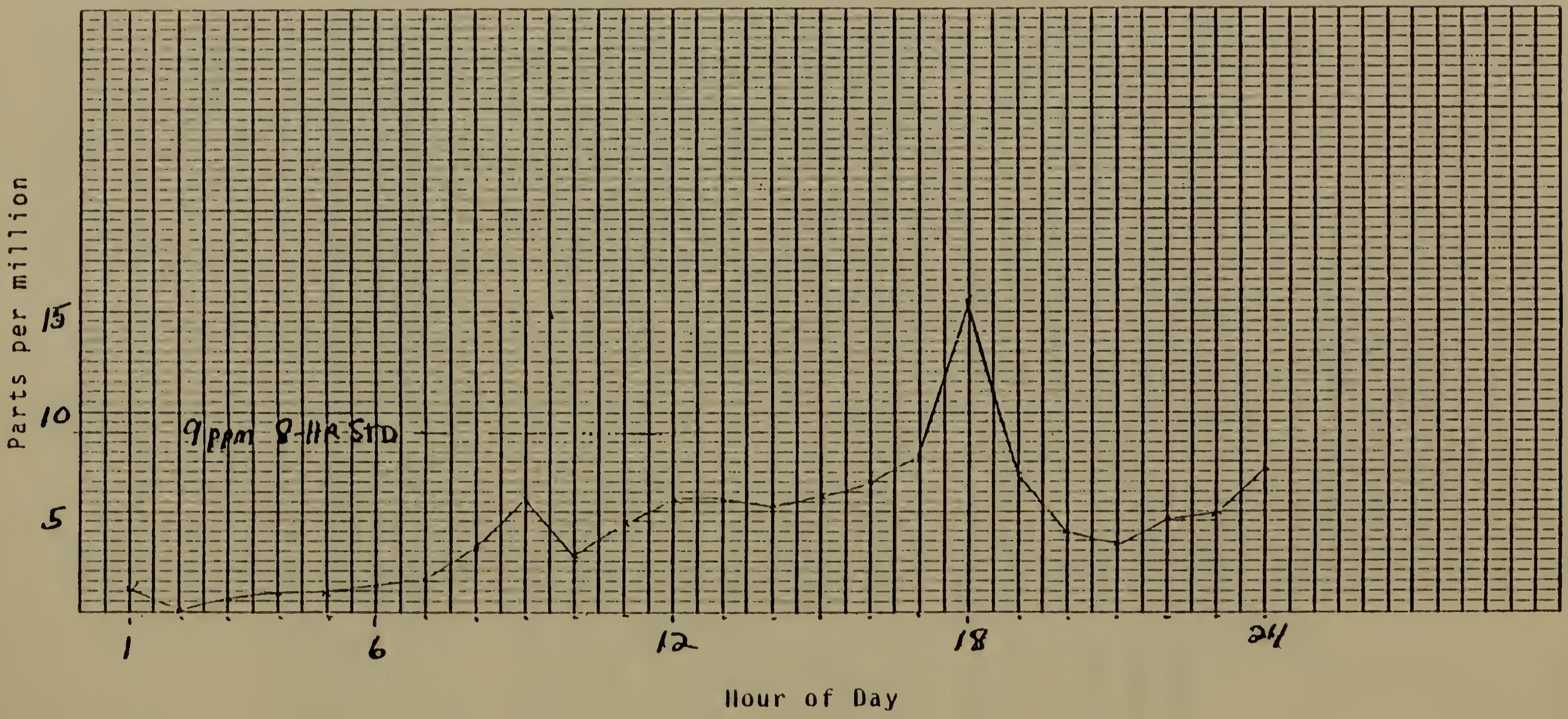

FIG. 3.2A. Measured Hourly Average Carbon Monoxide (CO) Levels at Arch Street on Monday, 7/17/78.

Comments:

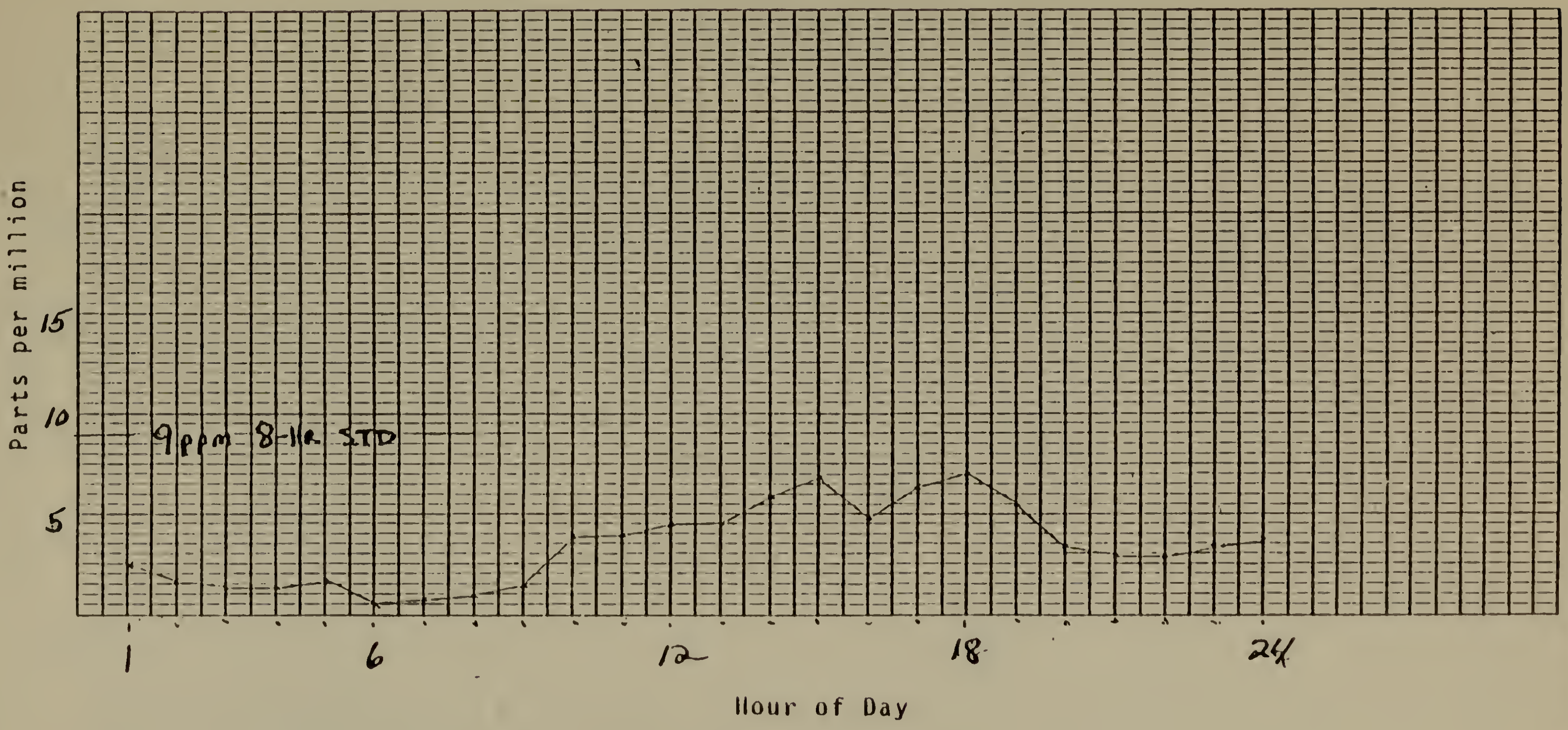

FIG. 3.2B. Measured Hourly Average Carbon Monoxide (CO) Levels at Arch Street on Thursday, 7/13/78.

Comments:

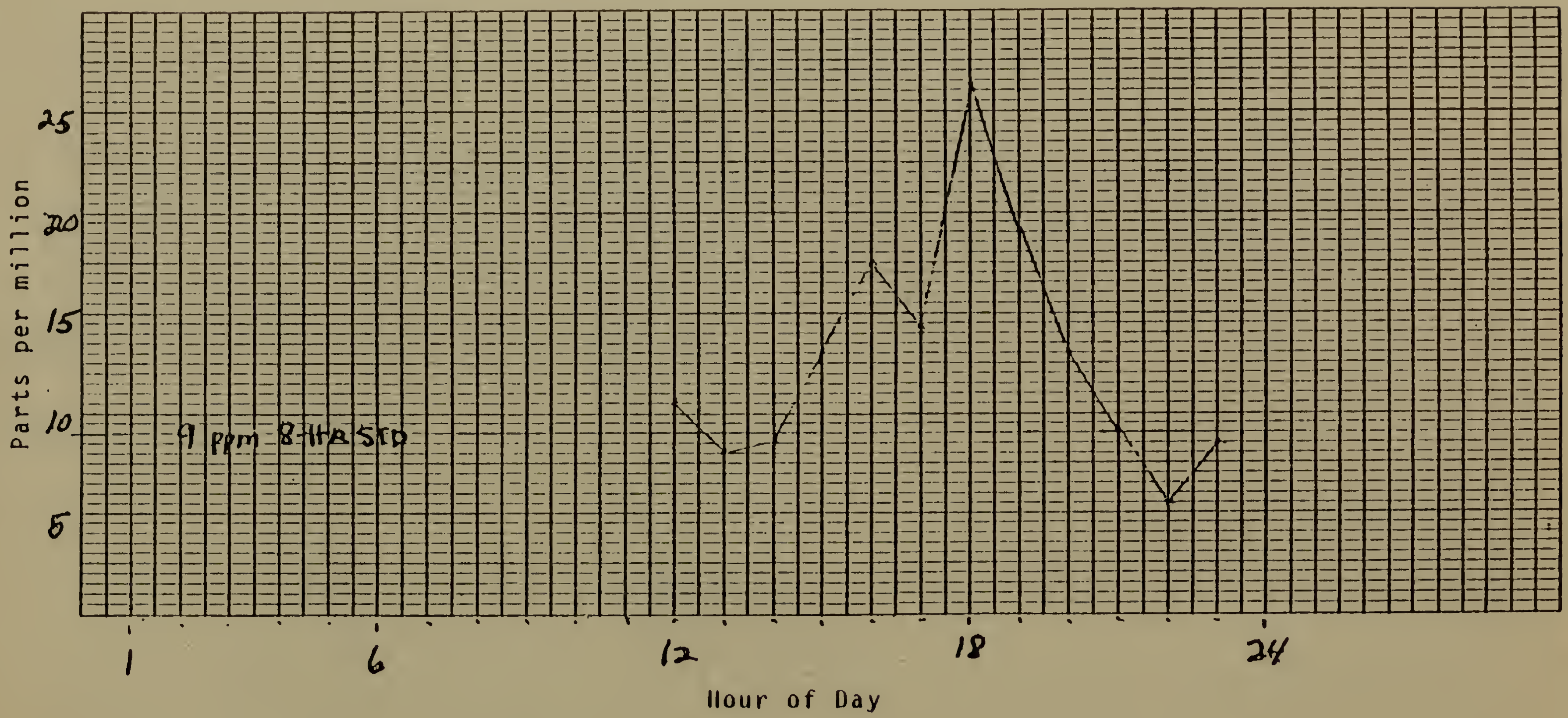

FIG. 3.3A. Measured Hourly Average Carbon Monoxide (CO) Levels at Winter Street Site on Monday, 7/13/78.

Comments:

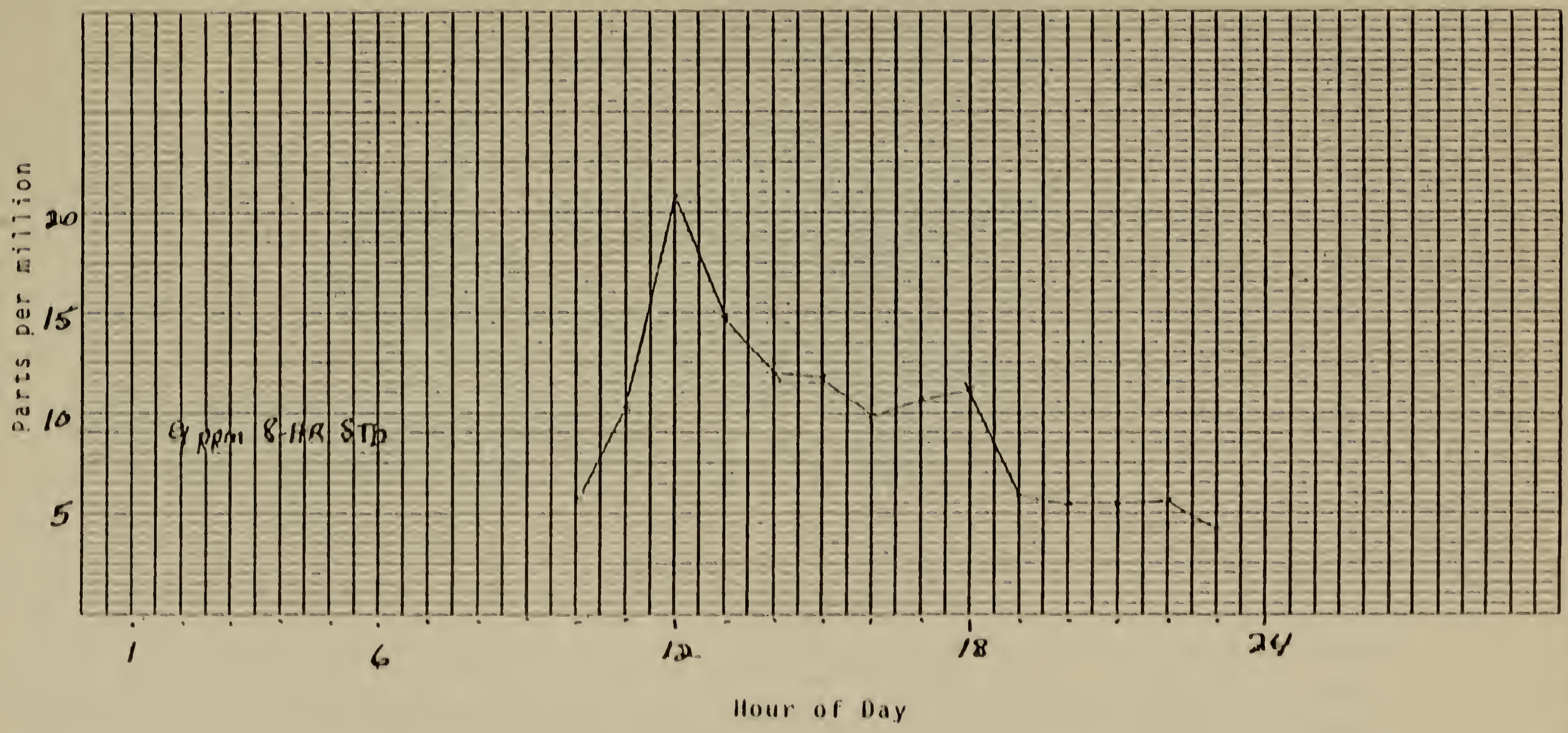

FIG. 3.3B. Measured Hourly Average Carbon Monoxide (CO) Levels at Winter Street Site on Thursday, 7/20/78.

BOLT BERANEK AND NEWMAN INC.
50 MOULTON STREET K.MENG CHING
CAMBRIDGE, MA 02138 SENIOR TECHNICAL STAFF

RUN 15 AUG 1978
POST OFF ICE CO
LEAST SIGNIFICANT DIGIT = .1000

EID	YRDAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MMDDYY	DA	HI	LO	TOTAL
CO	78191																	61	76	31	39	60	37	25	21	71078	44	76	21	353
CO	78192	20	14	10	7	15	17	32	22	35	38	35	30	33	44	34	32	64	42	22	26	38	39	51	65	71178	32	65	7	779
CO	78193	33	27	27	16	14	20	31	47	43	45	54	49	58	56	62	87	140	62	94	83	98	39	77	70	71278	56	140	14	1334
CO	78194	34	32	25	14	25	16	28	54	86	54	45	39	53	48	49	47	58	54	35	35	34	42	40	34	71378	42	86	14	1002
CO	78195	23	20	18	21	6	10	17	13	75	40	31	51	54	52	42	51	50	48	31	22	30	23	29	24	71478	34	75	6	811
CO	78196	21	15	18	13	9	9	15	18	29	65	60	58	53	76	81	37	85	78	42	71	60	87	37	57	71578	46	87	9	1094
CO	78197	89	42	34	28	27	12	21	30	24	28	39	24	35	40	28	26	10	10	6	11	25	31	38	34	71678	29	89	6	699
CO	78198	32	14	11	9	8	20	74												111	86	140	128	116	143	71778	69	143	8	892
CO	78199	109	66	36	36	34	34	45	195	170	202	129	78	105	67	74	45	88	93	90	61	44	35	31	29	71878	75	202	29	1606
CO	78200	29	27	27	23	20	24	39	68	113	30	35	21	32	36	27	42	43	52	38	47	35	38	27	24	71978	40	113	20	961
CO	78201	24	15	12	14	14	20	23	47	81	63	47	47	40	40	42	49	49	51	40	33	40	24	33	31	72078	37	81	12	879
CO	78202	27	26	26	31	14	15	26	46	59	62	66	62	54	56	63	57	98	82	62	22	36	38	38	40	72178	46	98	11	1106
CO	78203	37	30	31	24	26	24	32	52	39	30	31	36	40	40	42	48	39	43	36	45	44	60	83	64	72278	41	83	24	976
CO	78204	71	46	50	34	18	16	21	26	17	17				20	17	20	17	22	27	27	34	35	42	19	72378	28	71	16	596
CO	78205	18	12	16	12	14	10	21	39	123	90	136	136	142	53	79	67	122	76	47	17	58	47	56		72478	62	142	10	1431
CO	78206	48	35	16	14	12	14	20	35	75	104	96	61	124	91	136	127	129	51	32	28	25	31	29	35	72578	60	127	12	1438
CO	78207	24	20	23	22	21	30	65	69	120	88															72678	48	120	20	482

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BOLT BERANEK AND NEWMAN INC.
50 MOULTON STREET
CAMBRIDGE, MA 02138

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COP 78194									10	42	24	18	13	15	10	16	16	19	18	9	17	4	9		71378	18	42	4	275
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COP 78198											84	101	96	74	92	101	104	4	28	17	40	35	29	44	71778	61	104	4	849
COP 78199	28	14	7	1	0	0	0	32	52	70	75	50	56	48	46	41	45	49	53	45	34	16	9	14	71878	33	75	0	785
COP 78200	12	7	8	5	1	7												24	9	21	10	8	3	0	71978	9	24	0	115
COP 78201	0	0	1	0						33	51	62	38	31	36	47	30	18	8	5	12	0	0	4	72078	20	62	0	381
COP 78202	15									37	33	27	14	12	14	15	23	7	5	3	0	8	15	2	72178	15	37	0	235
COP 78203	5	0	0	0	0	0	4	6	6	7	0	6	4	5	0	0	0	0	0	0	15	5	4	9	72278	3	15	0	76
COP 78204	9	6	1	0	0	0	0	1	0	0															72378	2	9	0	17
COP 78206									15	5	11	27	47	69	57										72578	33	69	5	231

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BOLT BERANEK AND NEWMAN INC.
50 MOULTON STREET   K. HENG CHING
CAMBRIDGE, MA 02138   SENIOR TECHNICAL STAFF

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CON 78191												18	42	45	44	66	64	111	76	52	66	23	10	10	71078	49	111	10	634
CON 78192	11	9	8	3	10	4	4	12	8	10	13	12	9	16	20	34	33	21	18	10	15	4	11	13	71178	13	34	3	308
CON 78193	12	16	15	3	5	11	22	17	36	37	32	16	20	20	20	39	20	35	17	23	23	28	36	35	71278	22	39	3	538
CON 78194	25	17	14	14	16	5	6	9	14	37	39	45	45	58	68	42	64	70	55	33	28	22	34	36	71378	34	70	5	806
CON 78195	17	11	11	5	8	8	34	44	54	37	57	54	53	56	58	70	41	38	27	17	13	15	13	12	71478	32	70	5	766
CON 78196	6	4	4	5	2	0	8	16	12	33	51	57	70	56	53	43	42	31	43	37	17	15	10	17	71578	26	70	0	632
CON 78197	16	15	11	8	10	8	11	10	16	13	19	29	36	17	8	14	24	11	27	8	8	5	9	17	71678	15	36	5	350
CON 78198	12	1	6	8	10	13	16	33	58	29	45	56	56	54	57	65	76	157	69	39	34	46	48	71	71778	44	157	1	1059
CON 78199	53	45	24	23	13	13	12	22	39	36	57	34	62	43	55	71	71	75	49	21	21	41	55	22	71878	40	75	12	961
CON 78200	22	12	14	10	6	9	20	21	67	60	41	40	32	41	42	45	61	69	50	63	46	28	25	20	71978	36	69	6	856
CON 78201	17	12	17	8	11	13	22	25	18	65	22	40	45	46		40	40	53	46	28	26	15	18	22	72078	30	65	8	679
CON 78202	12	11	9	11	4	7	15	11	36	55	88	78	49	52	42	52	49	63	40	31	19	26	19	19	72178	33	88	4	801
CON 78203	20	12	14	9	3	3	18	7	19	27	44	32	23	12	25	18	34	33	28	28	34	12	25	27	72278	21	44	3	510
CON 78204	36	35	19	19	12	9	12	18	25	30	36	40	51	44	31	23	40	37	63	34	26	21	13	6	72378	28	63	6	670
CON 78205	2	2	1	0	0	0	1	1	8	24	32	30	54	71	39	38	36	47	36	27	40	31	34	20	72478	24	71	0	574
CON 78206	17	10	9	5	6	6	17	45	21	36			40	54	64	58	76	63	49	22	13	9	17		72578	30	76	5	637
CON 78207								50	45	40															72678	45	50	40	135

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CON 78193                                                                 199 189 191 212 193 187 204      71278 196 212 182  1375
CON 78194                                         104                      86 142  49  42  57  46  32      71378  70 142  32   558
CON 78195                                          39 142 162  91 133 143 136 174  94  46  54  38  45      71478 104 174  38  1347
CON 78198                                             106  81  86 131 125 144 263 191 131  92  54  86      71278 128 263  54  1540
CON 78199                                      89  81 227 159 134 104 123 108 217  45  25  44  66  47      71878 105 227  25  1469
CON 78200                                      71  89 112  95 185 164 107 100 107  89  98  60  48  54      71978  99 185  48  1379
CON 78201                                      56 113 208 149 120 119  99 102 111  59  55  55  56  43      72078  96 208  43  1350
CON 78202                                                             106 127 103  80  38  41  51  51  60  72178  73 127  38   657
CON 78203  40  44                                                                                          72278  42  44  40    84
CON 78205                                      54  89  71 130  70  51  68  46                              72478  72 130  46   579
CON 78206                                          91  68 124 134 141 132  43  49  29  38  39  24  37  31  72578  70 141  24   980
CON 78207  17   8  19  13  18  18  40  62  39  78  76 105 140 141 115  73                                  72678  60 141   8   952
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APPENDIX C

Performance Specifications for the Monitoring Equipment

The Beckman Model 865 Infrared Analyzer

INTRODUCTION

The Model 865 Infrared Analyzer automatically and continuously determines the concentration of a particular component of interest in a flowing mixture. The analysis is based on a differential measurement of the absorption of infrared energy. The instrument has a wide range of applications, subject only to the limitation that the analysis involve the determination of a single component, which must absorb infrared energy.

The Model 865 Infrared Analyzer is available in two versions: General-Purpose, Figure 1-1: and Explosion-Proof, Figure 1-2. These differ only in physical configuration; *functionally*, they are identical.

Within the analyzer, two equal-energy infrared beams are directed through two optical cells: a flowthrough sample cell and a sealed reference cell. Solid-state electronic circuitry continuously measures the *difference* between the amounts of infrared energy absorbed in the two cells. This difference is a measure of the concentration of the component of interest in the sample. Readout is on a front-panel meter with 0-to-100 scale. In addition, a field-selectable output for a potentiometric (voltage) recorder is provided as standard. A field-selectable output for a current-type recorder or controller is obtainable through use of an optional plug-in circuit board.

A calibration curve can be used to convert meter or recorder readings into concentration values. Alternatively, the analyzer may utilize an optional plug-in linearizer circuit board to equip a given operating range for *linear readout of concentration values* on the meter and on a potentiometric recorder.

For convenient routine upscale calibration, the analyzer may incorporate an optional calibration accessory. Depression of a pushbutton inserts a reflecting window into the sample beam. The window reflects a fixed amount of infrared energy out of the beam, to simulate a specific concentration of the measured component.

As an option, the analyzer may be equipped for *remote* selection of Range 1 or 3.

The electronic circuitry utilizes plug-in printed circuit boards with solid-state components. This feature provides the ultimate in reliability, facilitates servicing, and permits the inclusion of various options, such as current output, by addition of the appropriate boards.

SPECIFICATIONS

ACCURACY
1% of full scale.

SPAN DRIFT*
±1% of fullscale in 24 hours.

ZERO DRIFT*
±1% of fullscale in 24 hours.

AMBIENT TEMPERATURE RANGE
30°F to 120°F (−1°C to 49°C).

LINE VOLTAGE
115 ±15 volts rms.

LINE FREQUENCY
50/60 ±0.5 Hz.

POWER CONSUMPTION
400 watts.

ELECTRONIC RESPONSE TIME
(0 TO 90% OF FULLSCALE)
Switch selection of fast or slow response.
FAST switch position provides 0.5-second response (optional 1-second response obtainable by clipping jumpers).
SLOW switch position provides 2.5-second response.

OUTPUT
Standard (Potentiometric)
0 to 10, 0 to 100 millivolts, 0 to 1, 0 to 5 volts d.c. (field-selectable).
Optional (Current)
4 to 20 and 10 to 50 milliamperes, d.c. (field-selectable).
or, Linearized (Potentiometric)
0 to 10, 0 to 100 millivolts, 0 to 1, 0 to 5 volts d.c. (field-selectable).

CATALOG NUMBERS AND CASE ELECTRICAL CLASSIFICATIONS

194501	General-Purpose Model 865 Infrared Analyzer: general-purpose case; accessory air purge kit designed for ISA Type Z.
194502	Explosion-Proof Model 865 Infrared Analyzer, designed to meet Class 1, Group B/D, Division 1 requirements.

*Performance specifications based on ambient temperature shifts of less than 20 Fahrenheit degrees (11 Centrigrade degrees) at a maximum rate of 20 Fahrenheit degrees (11 Centrigrade degrees) per hour.

The Beckman Automatic Zero/Span Standardization Accessory for Gas Analyzers

FEATURES

Built-in twenty-four hour timer capable of initiating both full calibration sequences and separate zero sequences at any desired times within the twenty-four hour period. In addition, calibration sequences can be initiated by an externally supplied logic signal or by manual command via pushbutton.

Auto zero standardization point may be offset from zero by adding a selected resistor to the zero-correction circuit.

Out-of-range alarm lights warn operator when gas analyzer requires adjustment.

The ±15 volt power in the supply unit is capable of powering up to two other units, saving cost in systems applications.

Status lights notify operator when calibration sequence is occurring.

Built-in sample-and-hold amplifier will display last process value during calibration sequence for control applications.

SPECIFICATIONS

ERO, SPAN RESOLUTION
0.5% of fullscale.

ERO CORRECTION RANGE
15% of fullscale, minimum.

AN CORRECTION RANGE
10% of fullscale, minimum.

MBIENT TEMPERATURE RANGE
°F to 110°F.

UTPUTS
millivolts, 100 millivolts, 1 volt, 5 volts Potentiometric
andard. 4 to 20-milliamperes Isolated Current Optional.

INPUT
0 to 5 volts fullscale, either polarity.

SAMPLE-AND-HOLD DECAY RATE
Less than 1% of fullscale per 20 minutes.

LINE VOLTAGE
100 to 130 volts rms, 60 Hz.
200 to 260 volts rms, 50 Hz.

CALIBRATION SEQUENCE TIMES
2.5, 5, or 40 minutes, selectable.

Specifications for the Energetics Science Ecolyzer

Dimensions	13" x 7 3/8" x 7 3/8"
Weight	9 lbs.
Sensor	Electrochemical
Rise Time	25 sec.
Analytical Reproducibility	±1% of Full Scale
Zero Drift	0.5% of Full Scale in 24 hrs.
Span Drift	1% of Full Scale in 24 hrs.
Noise	±0.2% of Full Scale
Linearity	±1% of Full Scale
Minimum Detectable Sensitivity	1 ppm
Sampling Rate	700 cc/min.
Ambient Temperature Range	0° to 40°C (32° to 104°F)
Temperature Compensation	Built in thermistor compensation.
Relative Humidity Range	5% to 95% RH
Readout	Panel Meter 0-100 ppm CO, 100 divisons full scale, mirrored * Recorder output 0-1V (Recorder Optional)
Electronics	All solid state on printed circuit boards.
Calibration	Once a day with known standard of CO.
Sensor Life	Four (4) months in use.
Power	Electronics: Four (4) Nicad "C" cells Pump: One (1) Nicad "D" cell. Batteries automatically recharged from 120VAC, 60Hz power source.
Interference Equivalent	$\leqslant$1.0 ppm on the following.

CH_4	10,000 ppm	NO_2	12 ppm
NH_3	1,000 "	C_3H_8	5 "
SO_2	500 "	NO	1.5 "
H_2	48 "	C_2H_4	0.5 "
H_2S	30 "	C_2H_2	0.3 "

Lafayette Place
April 1978

Attachment D.2

SITE DESCRIPTION DATA

1. Agency: Boston Redevelopment Authority

2. Site Address/Location: #1: Washington & Bedford Streets
#2: Bedford & Chauncy Streets

3. Site Operator (Name): Parsons Brinckerhoff Quade & Douglas, Inc. Phone: (617) 426-7330

4. Site Classification (Activities within 1/4 mile):

a. Rural ☐

b. Residential, High Density ☐ , Low Density ☐

c. Commercial ☒

d. Industrial, High Pollution Potential ☐ , Low Pollution Potential ☐

c. Remarks:
Monitoring site is location of proposed commercial/hotel/office development in downtown Boston.

5. Local Environment: Type & Size Proximity Orientation

a. Population Centers:
Site located in center of central business district of the City of Boston. Nearest residential areas are Beacon Hill to the west (population 9250), North End/waterfront to the northeast (population 16,550), and Chinatown/South Cove to the south (population 2800).

b. Major Traffic Arteries:

Washington Street (adjacent to site, NW)	ADT = 10,900
Tremont Street (500 feet distant, NW)	ADT = 18,700
Central Artery (300 feet distant, E)	ADT = 140,400
Essex Street (400 feet distant, S)	ADT = 7,750
Summer Street (300 feet distant, N	ADT = 5,500

c. Local Pollution Sources:

Vehicular traffic, surrounding site
Building heating and mechanical systems, surrounding site

d. Remarks:

Site currently is used for open parking

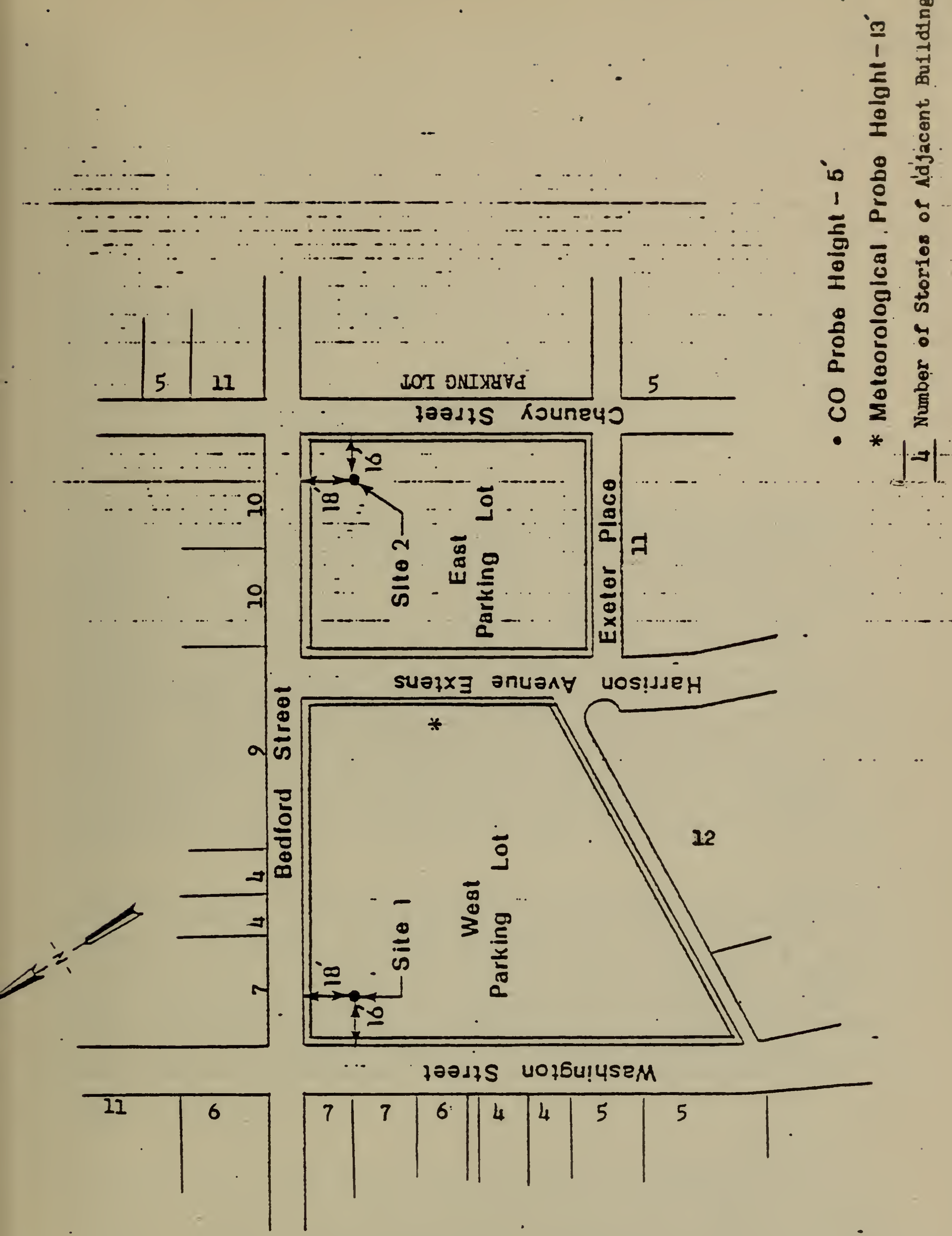
6. Air Monitoring Equipment: No ☐ Yes ☒

7. Meteorological Instrumentation: No ☐ Yes ☒

8. General Equipment Exposure:

	Air Monitor Inlet	Metro Sensor
a. Ground Floor	☒ Height = 5 feet	☒ Height = 13 feet
b. Intermediate Floor	☐	☐
c. Roof (ft. AGL/MSL)	☐ (ft. ABV Roof)	☐ (ft. ABV Roof)

d. Remarks:
Monitoring locations are shown on attached figure. Site is open parking area bordered on the north and west by buildings 4 to 11 stories in height, and by open areas immediately to the east and south.



[illegible] Location of CO Probes and Meteorological Equipment

Douglas M. Costle, Administrator
Environmental Protecton Agency
401 M Street, S.W.
Washington, D.C. 20460

ATTENTION: AIR QUALITY TECHNICAL ASSISTANCE DEMONSTRATION PROGRAM

Dear Mr. Costle:

I was very pleased to receive your letter announcing the Air Quality Technical Assistance Demonstration Program. The health of Boston's citizens and the health of Boston's economy are major concerns of my administration. Boston has been working to reduce the problem of air pollution for several years. As an element of the Boston Transportation Control Plan, we have limited the number of parking spaces in the downtown to the total available in 1973. A parking space bank was established by the Boston Air Pollution Control Commission and has been operating successfully for almost two years. Only this month we opened an Auto Restricted Zone (ARZ) which includes the core of our downtown. In this area, automobile traffic has been eliminated or sharply curtailed while mass transit routes and pedestrian space have been expanded. If Boston is selected to participate in this program, we will have a chance to continue to fight for new jobs for our many unemployed residents and to protect the health of all who live and work here.

I have designated the Boston Redevelopment Authority (BRA), which serves as the City's planning board and renewal agency, to prepare the application, and receive and administer the funds if our efforts are successful. The BRA's staff has dealt often and successfully with the diverse problems of environmental controls, economic development planning, transportation planning and comprehensive planning. Moreover, the agency's joint mandate in both development and planning has brought it into frequent contact with those state and federal agencies with responsibilities in these areas. Under the laws of Massachusetts, the BRA is legally empowered to undertake all actions required by the following proposal.

Although the BRA will be the responsible agency, I have specifically requested that it work closely with the Boston Air Pollution Control Commission, Boston's Economic Development Industrial Commission, the Economic and Employment Policy Administration and the Office of Federal Relations. Boston will make substantial contributions to the cost of the work described in this application including space, staff services, and some computer time.

BOSTON'S PROBLEM

A. Economic Development

Boston's great need, both as a governmental body and as a social entity, is a healthy private economy in which City residents have real and growing opportunities to participate. The most recent national recession resulted in the loss of over 50,000 jobs here, with the largest losses in the manufacturing and trade categories. While the number of jobs in the service sector has increased, City residents have captured only one of every three of these new service positions. It is, therefore, critical that the City maintain and expand employment opportunities in manufacturing. Yet, it is the development of manufacturing jobs which the 1977 Amendments make most difficult.

To make matters worse, a cold climate, high energy costs and high transportation costs combine with other factors to force low and middle income families to cope with the highest living costs in the contiguous 48 states.

To resolve these problems, Boston must over come certain formidable obstacles. It is: (1) the only city in the United States which has no major revenue-raising power besides the property tax; (2) the site of the highest proportion of tax-exempt property of any major U.S. city; and (3) the regional center and place of employment for non-residents who enter the City daily, paying nothing for the use of its services, while outnumbering the resident population by over 50% -- a ratio which far exceeds that of any other major U.S. central city. (Many commute by private auto which creates additional pollution.)

B. Air Pollution

Boston is the hub of the Metropolitan Boston Air Quality Control District. Current limited monitoring by the Commonwealth's Department of Environmental Quality Engineering shows that air quality standards are being violated for carbon monoxide, photochemical oxidants and total suspended particulates. Every monitoring site in the region for carbon monoxide exceeds the primary (health related) standard, and monitoring sites in the City (of which there are only two) exceed the standard most frequently. The ozone level exceeds the standard forty to fifty percent of summer days, with maximum levels of two to three times the standard.

Current SO_2 levels barely meet ambient air quality standards. Boston's air quality and potential for future development will be negatively affected by recent State legislation which allows major utilities to burn high sulfur fuel. This results in pollution levels for SO_2 at or close to the standard levels, allowing limited or no growth in emissions for this industrial pollutant.

Since virtually all of the pollution produced within the City comes from the consumption of energy, successful efforts to conserve energy used for transportation, manufacturing and heating will have a two-fold effect on economic development: reduced disparity in energy costs for Boston as compared to the rest of the country, and less pollution here, "opening the air" for economic expansion.

Boston lacks the financial and technical resources to evaluate its development options in terms of air quality limitations or to participate adequately in the formulation of the State Implementation Plan (SIP). While the State must respond to the single task of meeting air pollution standards established by the 1977 Clean Air Act Amendments, the City has the dual responsibility of protecting the health of its residents and of its economy. To meet both these objectives, it will be necessary to undertake more detailed analysis of where specific pollutants come from, where they flow, and where they concentrate. Only when this information is available can decisions be made about where to allow or prohibit new development, how to select and locate industry, and how to protect residential areas from transportation and industrial emissions.

BOSTON'S PLAN

Boston's proposal calls for the establishment of a coordinated planning effort to deal with three closely related problems: meeting air quality standards, promotion of economic development and long-range energy conservation.

Preliminary work on the development of a comprehensive economic development plan has already been undertaken as a result of Boston's selection as one of the trial cities for the Economic Development Administration's CEDS (Comprehensive Economic Development Strategies) Program. With technical assistance funding from EDA, we will continue our analysis of development goals, programs, projects and incentives and our formulation of a coherent City policy. The work on CEDS is being conducted by the Boston Redevelopment Authority with the assistance of other City departments and agencies. A policy committee of high-level City staff, representatives from the development and banking communities and interested citizens has been established to oversee the staff work. The first series of CEDS reports will be submitted to EDA by the end of September. However, considerable effort will then be necessary to incorporate the impacts of the 1977 Clean Air Amendments into this economic development planning process.

A similar, but less extensive effort has been underway in the area of long-range energy conservation planning. Boston has applied to the Department of Energy for funding. While awaiting word on possible funding, we have gone ahead on several aspects of energy planning using existing staff resources and City funds.

If we fail to confront these issues jointly, not only will new plants be unable to open in Boston, but existing industries wishing to expand and increase their employment might be forced to relocate to other, less restricted areas. Since much of Boston's current economic growth is in "incubator industries", an air pollution control plan which does not allow for expansion of those innovative companies which are successful would have a negative impact on the entire City.

PRODUCTS

At the end of the two-year demonstration period, the City will have developed and placed in operation the following products:

(1) An in-house capability to project and assess the air quality impacts of transportation and development programs and projects. The City is requesting the assistance of pertinent graduate schools to assist us in data analysis and development of projections and assessments. In addition, we are requesting the assistance of the university community in evaluating our own efforts at the end of the grant period.

(2) Air quality and traffic monitoring systems capable of providing the data needed to evaluate projects in terms of pollution limits and economic benefits. Boston will use a portion of the funds available under this demonstration program to establish new air monitoring stations in addition to the two the Commonwealth maintains. We will also attempt to acquire additional DOT funding for the acquisition and installation of the equipment necessary to provide a continuous cordon count of traffic within the central area of Boston. However, the success of our proposal is not dependent on receipt of these additional funds.

(3) Specific criteria for use by the City in evaluating types of industries most desirable to attract to Boston. We have begun formulating specific economic development goals under EDA's CEDS program. Funds from the Air Quality Technical Assistance Demonstration Program will be used to develop air pollution criteria, specifically related to pollution levels, that would become part of the economic development planning process. Specifically, these criteria will be applied to information already collected for the Commonwealth in a recent EPA-funded study relating pollution production to unit of manufacturing output. The result will be a list of industries to which our marketing efforts will be directed.

(4) Legal and technical capacity to acquire, bank and allocate offsets. Successful State and City efforts to reduce air pollution, along with natural attrition among businesses, will result in creation of a certain amount of offsets that will enable new industry to move into the City without inhibiting our progress toward attainment of air quality standards mandated by the 1977 Amendments. These Amendments effectively turn reduction of air pollution emissions into a marketable "good". To make sure that transformation takes place equitably, new laws and procedures must be established to regulate the creation, ownership, banking and sale of offsets.

In addition, the development of these products will enable the City to participate effectively with regional and State agencies in the design and quantification of the State Implementation Plan.

I am sure that you will review this proposal carefully and give full consideration to Boston's needs and capabilities. I know that this demonstration program will be of great benefit not only to our city, but to your efforts to assist others in dealing with the immensely complex problems associated with providing a healthful environment and a healthy economy.

Sincerely,

Kevin H. White
Mayor

Attachment D.4

Marcia Myers BRA
Al Horn - Fed Compliance

Advisory Council On Historic Preservation

1522 K Street N.W.
Washington D.C.
20005

RECEIVED
OCT 26 1978
MAYOR'S OFFICE

October 23, 1978

Honorable Kevin H. White
Mayor of Boston
Boston, Massachusetts 02201

Dear Mayor White:

On October 10, 1978, we received your concurrence to the condition for the Washington Street Theatre District, Boston, Massachusetts. A copy of that letter is enclosed. As you agree to this condition, the Executive Director does not object to your determination of no adverse effect.

You should include a copy of this correspondence in any environmental assessment or statement as evidence of your compliance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320).

Thank you for your prompt reply.

Sincerely,

Jordan E Tannenbaum

for Myra F. Harrison
Assistant Director
Office of Review and Compliance

Enclosure

4 copies

Advisory Council on
Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

September 22, 1978

Honorable Kevin H. White
Boston City Hall
One City Hall Square
Boston, Massachusetts 02201

Dear Mayor White:

We have received your letter of July 17, 1978, and your Draft Environmental Impact Statement of August 7, 1978, concerning the city of Boston's proposed Lafayette Place Development Project, Boston, Massachusetts, a project that may be assisted by an Urban Development Action Grant from the U.S. Department of Housing and Urban Development. That documentation supports your determination that the Lafayette Place Development Project will have no adverse effect on the Washington Street Theatre District, a property that has been determined to be eligible for inclusion in the National Register of Historic Places.

The Executive Director will not object to your determination of no adverse effect if the following condition is met:

> Prior to commencing construction the city of Boston will submit the final plans and specifications for the project to the Massachusetts State Historic Preservation Officer for review and approval. If, after review the State Historic Preservation Officer is of the opinion the undertaking will have an adverse effect on the Washington Street Theatre District, the City will request the comments of the Council in accordance with Section 800.4(e) of the Council's Procedures.

If you agree to this condition, please sign on the concurrence line below and return this letter to us. Upon receipt we will acknowledge that the Executive Director does not object to your determination of no adverse effect. This will satisfy your responsibility pursuant to Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320) and the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800).

Thank you for your cooperation.

Sincerely yours,

Myra F. Harrison
Assistant Director
Office of Review and Compliance

I concur:

Kevin H. White

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.

PRELIMINARY ASSESSMENT OF WIND EFFECTS AT THE LAFAYETTE PLACE PROJECT, BOSTON, MASSACHUSETTS

R. E. Hayden
Bolt Beranek and Newman, Inc.
Cambridge, MA 02138

October 1978

Submitted to:

Boston Redevelopment Authority
1 City Hall
Boston, MA 02108

Attn: Mr. Richard B. Mertens
Environmental Review Officer

PRELIMINARY ASSESSMENT OF WIND EFFECTS AT THE LAFAYETTE PLACE PROJECT

This report describes the results of a preliminary study of the existing plans for the Lafayette Place Project in Boston to ascertain the possibility of adverse wind effects in and around the project. As the design process is an evolutionary one, and since precise indications of wind problems cannot be made quantitatively without the aide of wind tunnel studies, the findings of this preliminary study should be viewed at providing guidance toward the future phases of design development of the project. The first part of this report describes wind effects in general and the currently used criteria for pedestrian level winds.

Wind impact at this project or any project can generally be separated into three areas of interest:

(1) pedestrian level wind effects

(2) air quality impact (such as arising from emissions from the parking garage)

(3) structural loading effects on the project elements and on nearby structures

The net effect of these three factors cannot be fully quantified until the project design has been completed. The purpose of this study is to provide early warning of possible adverse wind impacts at an early enough stage to guide further design development and possible wind tunnel testing. The second phase will be undertaken when the final design concept has been completed and a wind tunnel test program can be conducted.

GENERAL DISCUSSION OF PEDESTRIAN LEVEL WIND EFFECTS

A major contribution to the wind problems encountered by pedestrians near tall buildings arises from the way the tall building deflects or "pulls down" faster speed winds from a greater height. It is this interaction between a building and the wind velocity profile in the earth's boundary layer that is primarily responsible for many of the pedestrian level wind problems associated with "tall" buildings. Appendix A to this report, entitled "Wind & Tall Buildings", illustrates some of the basic air flow patterns involved near tall buildings. In particular, one should note the areas of high speed around corners of tall buildings, and between high and low rise buildings where wind can reach speeds of twice that in open areas at equivalent heights above the ground.

The degree to which wind degrades the value of a given location is not simply a function of wind speed. The impact depends upon temperature and precipitation conditions as well as the type of activity intended for the area. For example, a sheltered sitting, dining, reading or meeting area would be severely degraded by winds which may be quite tolerable on a street.

A recent National Science Foundation (NSF)-sponsored study[1] has suggested guideline standards for acceptable levels of wind activity for various site usages, e.g. pedestrian egress paths near high-rise buildings, street and arcade shopping areas, open

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Ref. 1. "Pedestrians and Wind in the Urban Environment", H. Cohen, T.I. McLaren et al, University of Massachusetts/IME/R-77/13.

parks and plazas etc. The suggested standards are reproduced below:

TABLE 1

Pedestrian Safety/Comfort Standards for Urban Winds

	Suggested Standards	
Activity Area	One-Hour-Average Wind Speed	Permitted Occurrence Frequency
All pedestrian areas--limit for safety	20 mph (9.1 m/sec)	0.1%
Major walkways, especially principal egress path for high-rise buildings	20 mph (9.1 m/sec)	0.1%
Other pedestrian walkways, including street and arcade shopping areas	14 mph (6.4 m/sec)	5%
Open plazas and park areas, walking, strolling activities	8 mph (3.6 m/sec)	15%
Open plaza and park sitting areas, open-air restaurants	5 mph (2.3 m/sec)	20%

This table indicates that for personnel safety, pedestrians should not be exposed to areas where the 1-hour average wind speeds exceed 20 mph on more than 0.1% of the time i.e. on more than about one half day per year.

For street and arcade shopping areas it is recommended that one-hour average wind speeds should not exceed 14 mph more than 5% of the time, or about 1·1/2 days per month.

For open-air plazas, designed for sitting or outside dining, it is recommended that the one-hour average wind speed should not exceed 5 mph on more than 20% of the time, or approximately six days per month.

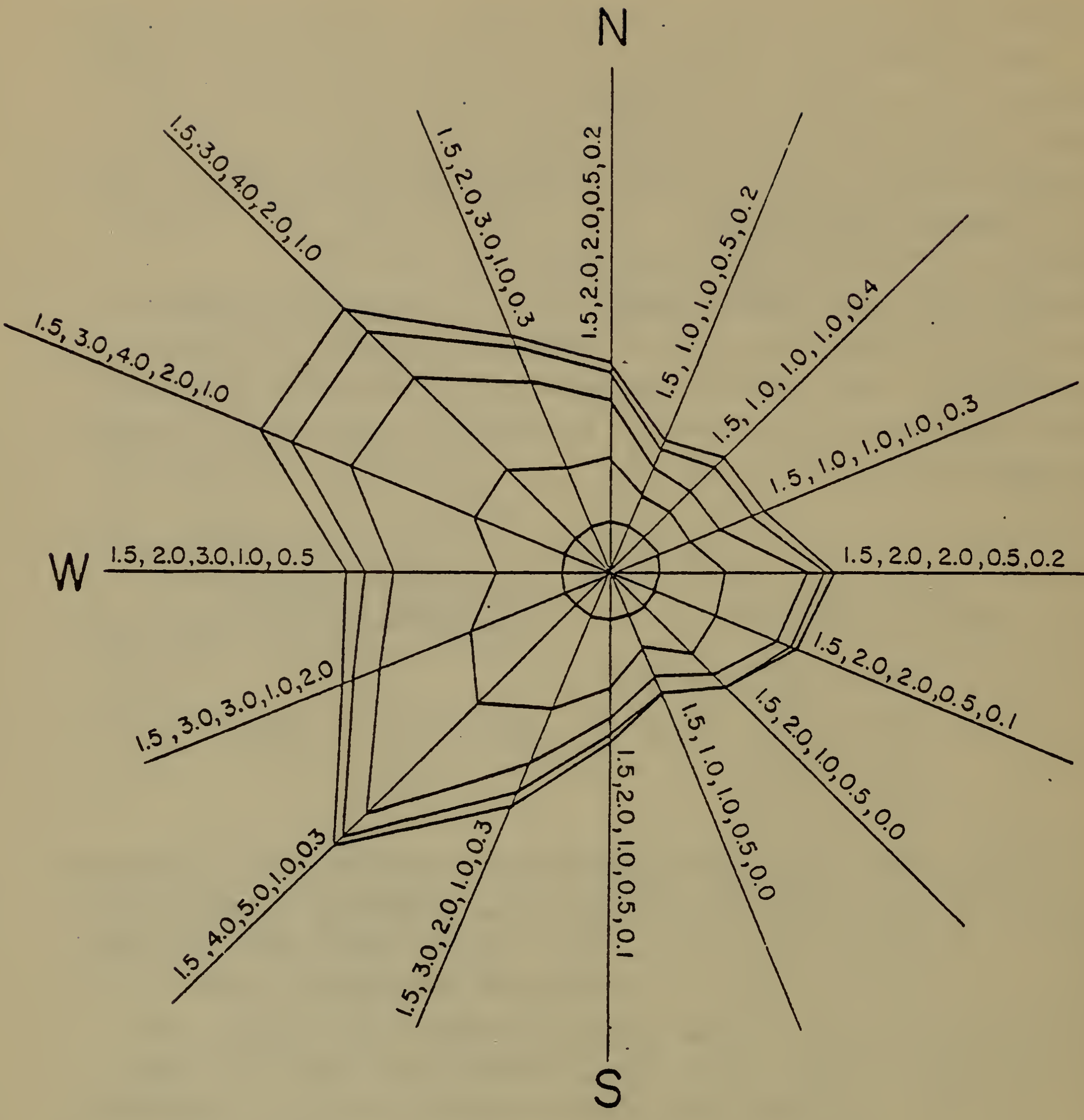
These guideline standards may be given some perspective by comparing the naturally occurring wind speeds at Logan Airport. Figure 1 shows the wind rose for annually-averaged wind speeds at Logan Airport, and the occurrence frequencies are broken down by wind speed and direction. It is seen that the most frequent winds are from the northwest and southwest quadrants.

The Logan wind data is measured at a very exposed location close to the water, and is at a height of 10 meters (33 feet) above ground. This may be translated into equivalent pedestrian height wind speed occurrences as presented in Table 2 (% figures have been rounded off).

TABLE 2

Wind Speed at Pedestrian Heights	Occurrence Frequency at Logan Airport
Over 20 mph	2%
Over 14 mph	15%
Over 8 mph	47%
Over 5 mph	78%

Clearly the naturally-occurring wind conditions at an exposed location at Logan Airport far exceed the standards suggested in Table 1. A primary role of the city, and of the Lafayette Place project, is thus to provide a protective environment for its pedestrian population. When this role is not fulfilled, as in past instances in many major cities including Boston, Chicago, San Francisco, etc. the result can be uncomfortable or dangerous wind speeds at pedestrian locations. However, with proper investigatory procedures, the pedestrian can be protected from an adverse wind environment.



Directions are those from which the wind blows. The sequence of numbers associated with a particular wind direction indicates the percent frequency of wind speeds in these ranges, 0-7, 8-12, 13-18, 19-24 and over 25 mph.

FIGURE 1. ANNUAL WINDROSE FOR BOSTON, MA (LOGAN AIRPORT; TEN YEAR INTERVAL 1951-1960)

The NSF study (which consisted of an extensive series of measurements and pedestrian interviews in Boston's downtown area) pointed out that the characteristic gustiness of winds near high-rise buildings could generate gust speeds of more than three times the average pedestrian wind speed near the building. Hence, a 1-hour average 20 mph wind speed at street level implies occasional gusts over 60 mph, which can definitely be hazardous to pedestrian balance and safety. In a commercially-oriented project such as Lafayette Place, economic factors associated with excessive winds (e.g., at one test site used in the NSF study a significant reduction was noted in the number of retail cash-register transactions on "windy" days.)

COMMENTS ON LIKELY WIND IMPACTS ASSOCIATED WITH PRELIMINARY DESIGN CONCEPT PRESENTED FOR LAFAYETTE PLACE

1. General Arrangement of Project:

The general arrangement of a project and its surrounding buildings can have significant effects on the potential for wind problems and for alleviation of wind related problems by minor design changes. As shown in Appendix A, certain combinations of building height and spacing induce substantial acceleration of the flow near the ground. In the particular case of Lafayette Place, the general arrangement seems quite favorable for minimizing wind impact once the directions of prevailing winds are considered; that is, no large-scale rearrangement of the project would be recommended. However, whenever a high-rise tower is located adjacent to intensively used pedestrian area, experience shows that there are always some pedestrian level wind problems and therefore, the specifics should be examined in more detail once the total design concept is finalized. Some specific comments are provided below on the areas of likely wind impact.

2. Specific Comments:

Wind impacts can be subdivided into:

(1) pedestrian level wind effects

(2) structural loads

(3) pollutant dispersion

The majority of this discussion pertains to the first two areas. Figure 1 in the previous section indicated that for Boston, on an annual average basis, the predominant wind directions are from the northwest, southwest, and from the east. Thus, we will discuss and illustrate the envisioned wind effects associated with these predominant wind directions.

Northwest Winds:

Figure 2 shows a plan view of the project with northwest winds sketched in. It is anticipated that some increase in winds along Washington Street will be produced by winds blowing from this direction and from the general direction of the west as well. Since this is a main entrance area for the retail complex and store fronts the possibility of protection of this area by parapits should be considered and examined in a future wind tunnel study. A likely area of high winds is the corner of Washington Street and the new street. The wind around the tower will be accelerated at the immediate base of the tower, especially at the corners. This will only affect those pedestrian areas at the elevated levels particularly in the pool area and other walking areas around the base of the building (on the elevated levels.) The wind along Chauncey Street will be very calm for this wind. direction. Winds within the mall area will be gusty due to the separated flow of the elevated structures and back flow induced by the tower. However, it is impossible to quantify the magnitude of these gusts without wind tunnel measurements on a scale model. The gusts may affect the structural loading of the canopies for the partially-covered pedestrian areas. It is envisioned that suitable solutions can be developed for all these problems if they are quantified by a wind tunnel test to be in excess of criteria for acceptable levels.

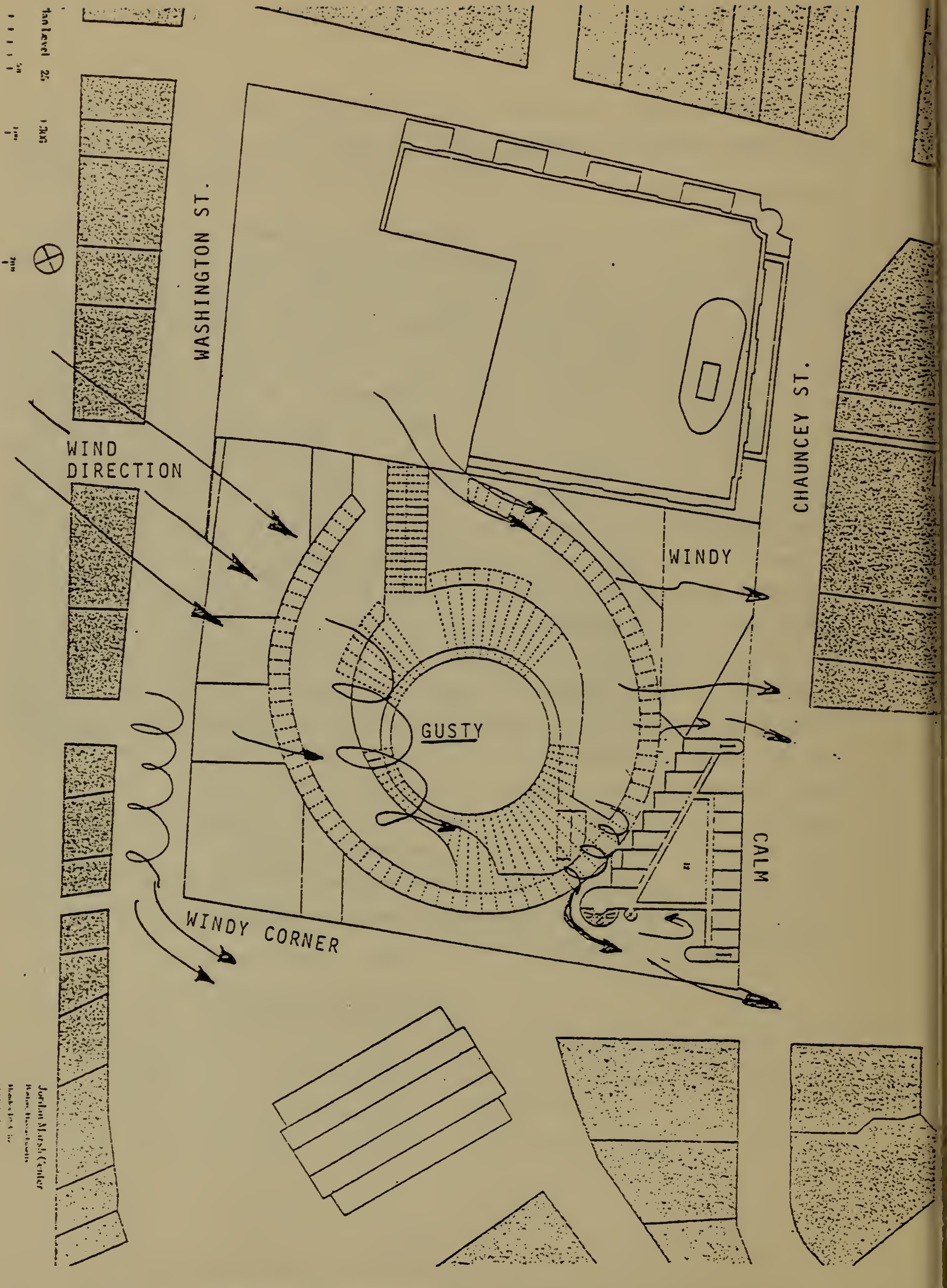


FIGURE 2. IMPACTS OF NW WINDS ON PROJECT & SURROUNDINGS

Southwest Winds:

Southwest winds (Figure 3) will produce generally similar effects to those from the northwest, although the direction of the street level winds will be different. Along Washington Street some increase in wind speed may be experienced at pedestrain level. Substantial increases in wind speeds are likely along the new street particularly in the area of the garage entrance. Removal of the Hayward Place garage may slightly mitigate this problem, although the magnitude of the alleviation produced by removal of the old garage cannot be quantified at this time. Again, gustiness will be experienced in the open mall area, the magnitude of which cannot be presently quantified. Fairly substantial winds will be experienced along the base of the tower in the elevated portion of the development. The pool area will be particularly windy when winds blow from this direction. Again, Chauncey Street will remain calm except at the corner of the new street where some minor increases in speed may be experienced. Pollution dispersion from the garage should be enhanced due to the turbulence behind the tower inducing substantial mixing near ground level.

Easterly Winds:

Easterly winds (Figure 4) should cause increases in wind speed along the general area of Chauncey Street and the new street. This will be due to the combined effects of the tower and the slight increase in building height of the overall project above existing levels. Washington Street and the new street will be quite calm during easterly winds. Again, substantial gustiness is likely in the vicinity of the enclosed to partially-enclosed shopping arcade. Strong winds again will occur in the area of

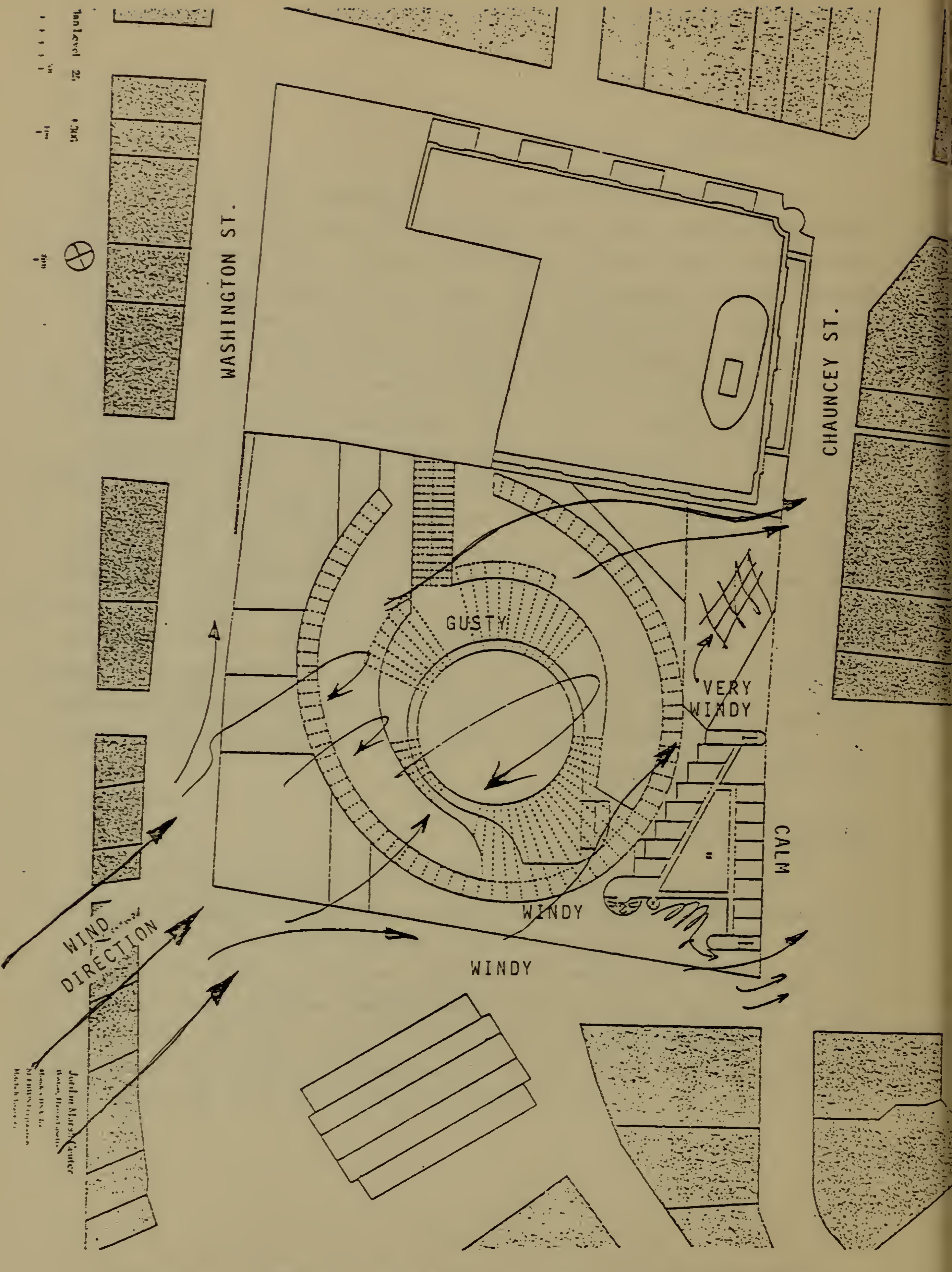


FIGURE 3. IMPACT OF SW WINDS ON PROJECT & SURROUNDINGS

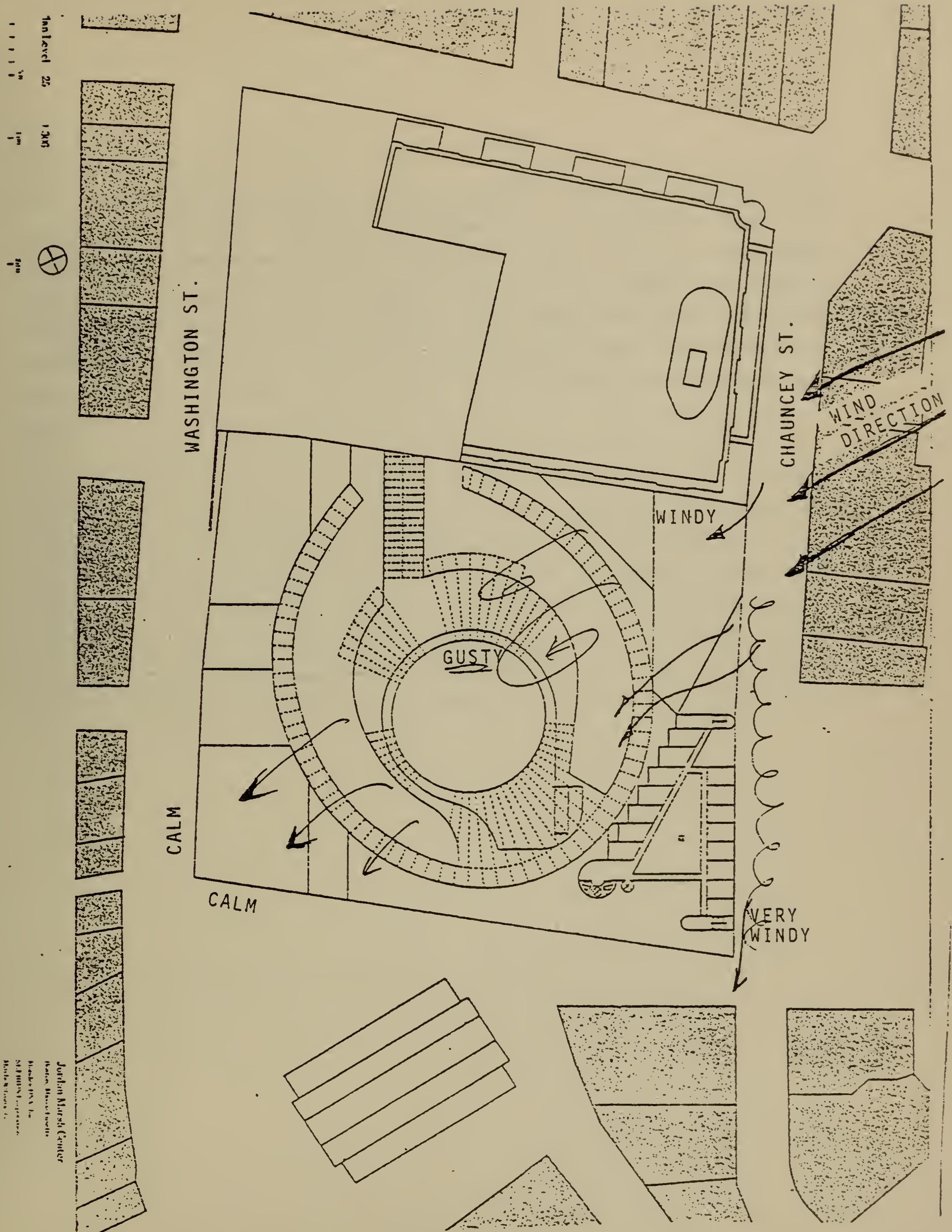


FIGURE 4. IMPACT OF EASTERLY WINDS ON PROJECT SURROUNDINGS

the elevated pool, especially at the corner of the new building and the corner of the Jordan building and the pool area. Mitigation measures for these adverse wind effects should be fairly straightforward once the magnitude of the increases have been quantified. These can include a minor step-in or parapit at the intersection of the high-rise portion of the development and the low-rise area, wind fences around the pool, or small canopies near pedestrian level.

SUMMARY OF WIND IMPACTS/PEDESTRIAN COMFORT

Pedestrian discomfort may be expected along Washington Street and possibly within the enclosed arcade area during the most chilling portions of the year (in which northwest winds are the predominant directions). Due to the unusual configuration presented by the high-rise and the partially open mall area, the extent of the winds within the mall must be quantified by a wind tunnel test. It would appear that rather straightforward mitigation measures for pedestrian discomfort problems will be possible. During easterly winds substantial pedestrian problems may exist along Chauncey Street, but again, rather straightforward mitigation measures are envisioned. The general area around the high-rise is likely to be an area of general pedestrian discomfort, particularly in the area of the pool. This occurs because of the combination of the high-rise with the low-rise structures around it and the fact that the elevated pedestrian area is already exposed to relatively high speed winds. Some effort will be required to develop suitable wind mitigation measures for this elevated area.

STRUCTURAL LOADING

Structural load on the cladding of the high-rise and on the new structure over the mall may present some problems. However, the solution to these problems are straightforward once the magnitude of the wind-induced pressures has been determined. It is customary to address the structural loading problems once the design configuration has been finalized addressing functional and pedestrian wind effects. The gustiness in the mall area may present some substantial fluctuating loads on the roof over the mall area. These loads can be readily quantified in a suitably modelled wind tunnel test. Likewise, the wind pressures on the cladding of the high-rise tower can be measured at the same time. Once these measurements have been made a straightforward check on the integrity of the proposed structure can be made and necessary modifications carried out if required.

WIND TUNNEL STUDIES

A wind tunnel test is recommended for the Lafayette Place Project to quantify the wind speeds at key pedestrian locations and to test the effectiveness of proposed solutions to those problems which are found to be well in excess of criteria applicable to the functions envisioned for various parts of the project. The general high wind environment in Boston, the lack of precision associated with "paper studies" of unusually-configured buildings and structures, and recent experience with projects of similar scale and similar envisioned usage all dictate that such a step be taken.

Other studies of wind conditions in Boston (Refs. 2 & 3) have used wind tunnel models to measure and predict pedestrian level wind conditions at various locations around the respective projects. The wind tunnel study performed on the 60 State Street site examined the possibility of adverse wind impact on the then-to-be developed Quincy market area as a consequence of the new high-rise building. The study indicated that no adverse wind conditions would occur in the market area, and the market's present day success speaks to the accuracy of that prediction.

On the other hand, there are a number of locations in downtown Boston where wind activity levels near high-rise buildings are in excess of the (recently established) standards suggested in Table 1. At two of these locations, there have been a number of instances in the past few years where pedestrians have been blown over.

Ref. 2. A Study of Pedestrian Level Wind Effects near 60 State Street, Boston, MA, by T.I. McLaren. Submitted to Cabot Cabot & Forbes Co., June 1973.

Ref. 3. Pedestrian Wind Effects at the Park Plaza Project, Boston MA, by T.I. McLaren. Submitted to Boston Redevelopment Authority, 1975.

A wind tunnel test of the Lafayette Place Project should consist of three sequential steps:

(1) Quantifications of pedestrian-level wind problems inside and outside the project, and modelling of architecturally-acceptable modifications to the structures which lead to acceptable pedestrian-level winds.

(2) Modelling of air quality impact of the parking garage in the modified wind environment produced by the project. Once key sources of carbon monoxide (CO) and total hydrocarbons (THC) have been identified, wind tunnel modelling of the pollutant dispersion can be carried out using the same model as used for the pedestrian with effects study. This data can be combined with measurements of existing pollution levels at the site[4] to produce a quantitative assessment of the impact of the new project on local air quality.

(3) Measurement of structural loads on the high-rise cladding and mall roof, using the model which incorporates all modifications introduced to alleviate pedestrian wind problems.

Ref. 4. Chng, K.M. et al. "Air Quality Impact Analysis of the Proposed Lafayette Place Parking Garage", BBN Report #3842, prepared for the Boston Redevelopment Authority, June, 1978.

APPENDIX A

WIND AND TALL BUILDINGS

ILLUSTRATION OF COMMON EFFECTS

Bolt Beranek and Newman Inc.
50 Moulton Street
Cambridge, MA 02138

WIND AND TALL BUILDINGS:

ILLUSTRATION OF COMMON EFFECTS

The following series of figures illustrates some fundamental phenomena associated with wind interaction with tall buildings. These figures have been derived from wind tunnel tests in which the naturally occurring atmospheric boundary layer of the earth was properly simulated (see Figure 1(a), for example). Thus, the trends predicted by these illustrations provide guidance in identifying areas of potential high winds in planned (or existing) developments. However, one seldom finds situations in realistic urban environments as simple as those modelled in the wind tunnel for the purpose of illustrating these general effects. Therefore, one may find interaction of several of these simple flow phenomena, leading to significantly altered flow patterns and, often, to higher local wind speeds near the ground.

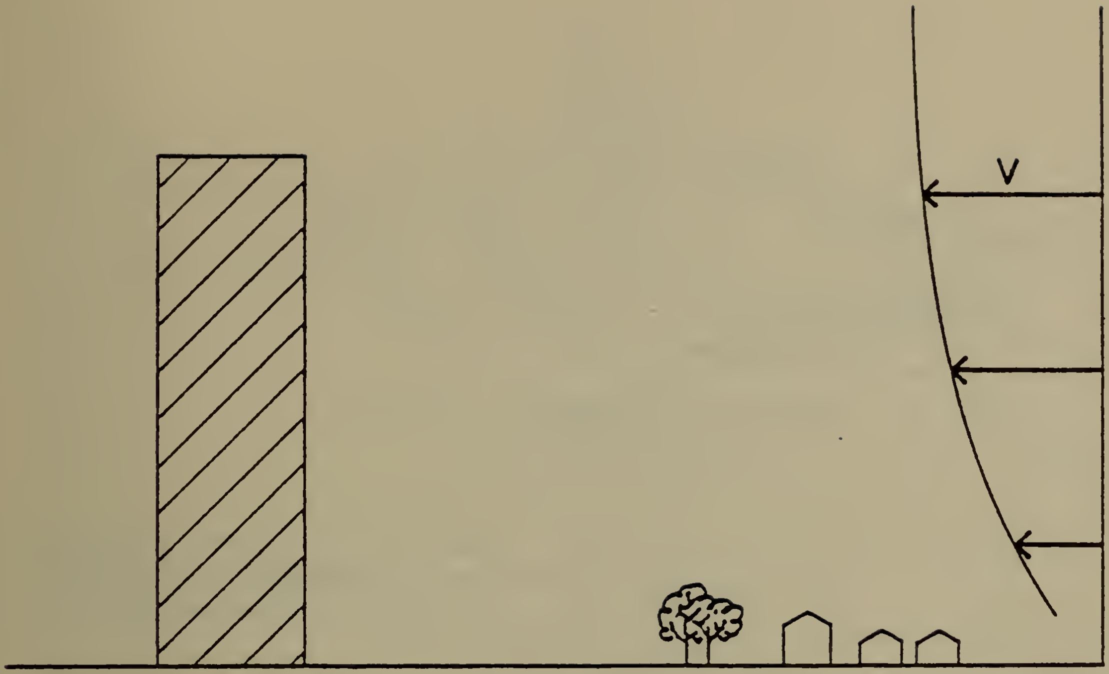


Figure 1 (a) The natural wind velocity profile. Topographical features such as buildings, trees, hills, etc. affect the shape of the velocity profile.

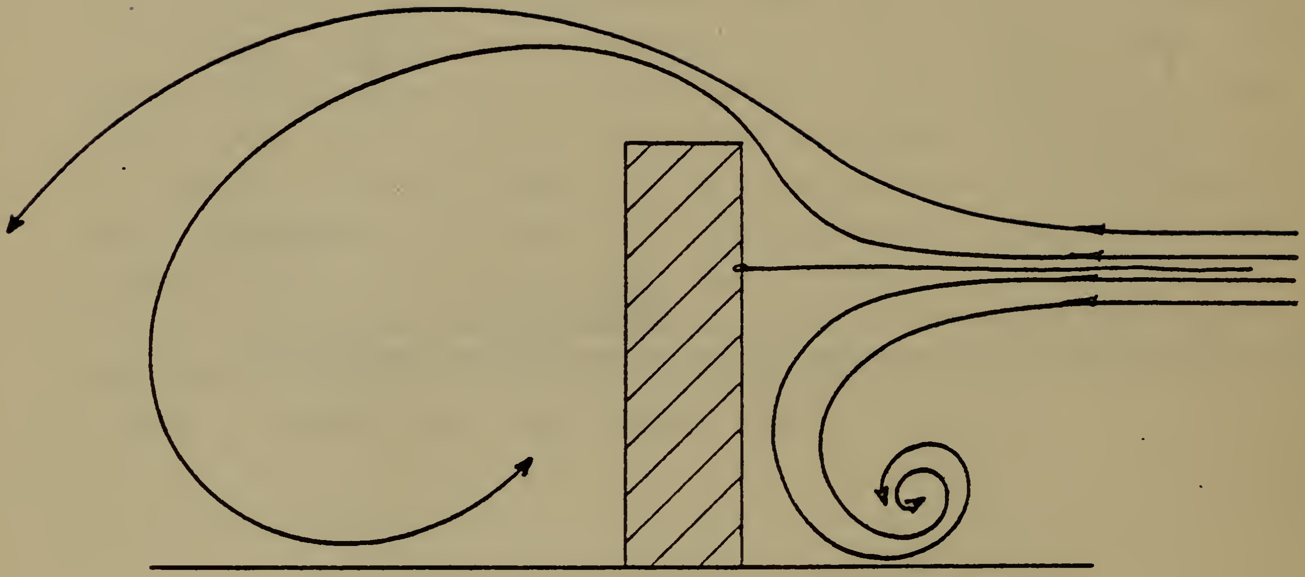
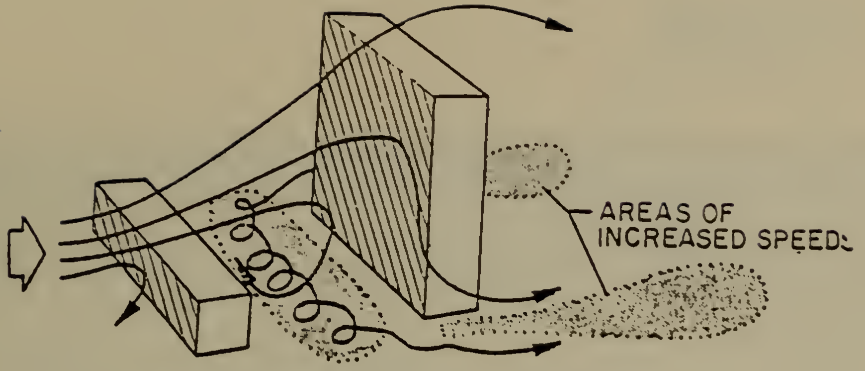
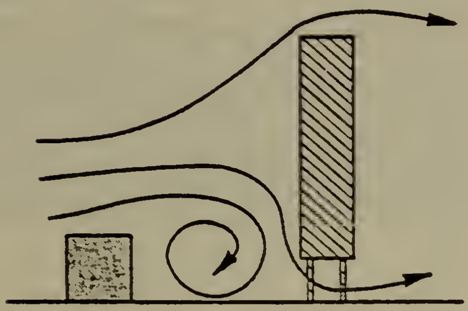


Figure 1 (b) Typical air flow pattern in front of wide building.

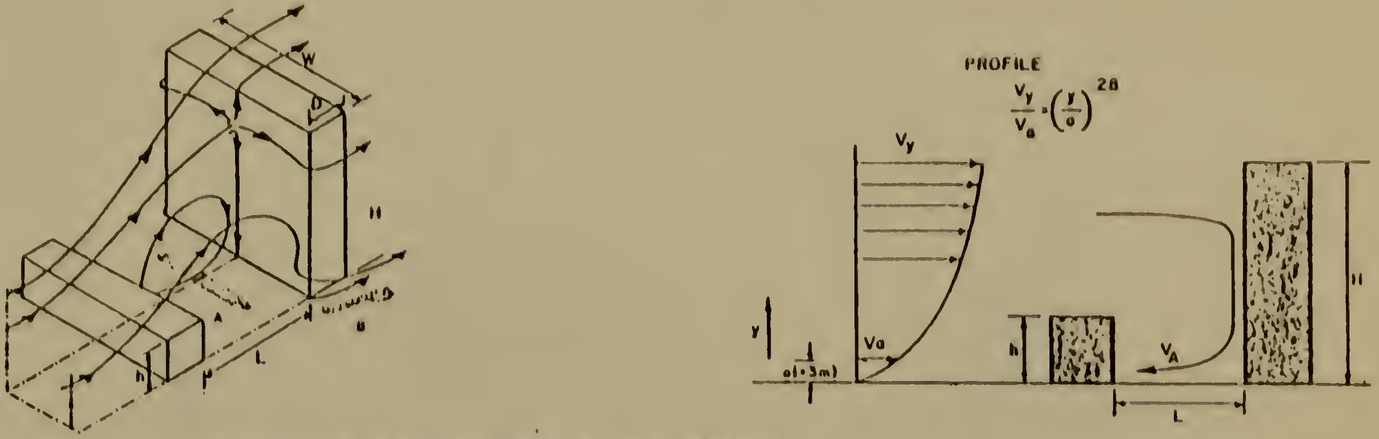


FLOW PATTERNS BETWEEN HIGH AND
LOW-RISE BUILDINGS

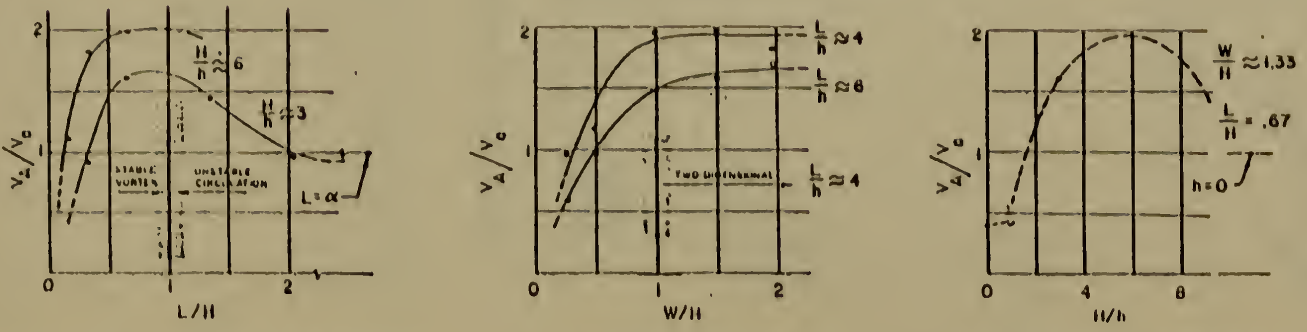


BUILDINGS WITH OPEN PASSAGEWAY

FIGURE 2(a) EFFECTS OF HIGH AND LOW RISE
STRUCTURES IN CLOSE PROXIMITY



SCHEMATIC FLOW PATTERN AND DEFINITION OF TERMS



EFFECT OF SPACING (LH) ON PEDESTRIAN WIND BETWEEN BUILDINGS

EFFECT OF FACE WIDTH ON PEDESTRIAN WINDS BETWEEN BUILDINGS

EFFECTS OF RELATIVE HEIGHTS ON ON PEDESTRIAN WIND SPEED BETWEEN BUILDINGS

FIGURE 2(b) QUANTITATIVE EFFECTS OF BUILDING GEOMETRY ON PEDESTRIAN LEVEL WINDS FOR SIMPLIFIED GEOMETRY (Note: Va/Va is the ratio of pedestrian wind in the space between the buildings to that at an equivalent height well upward of any buildings)

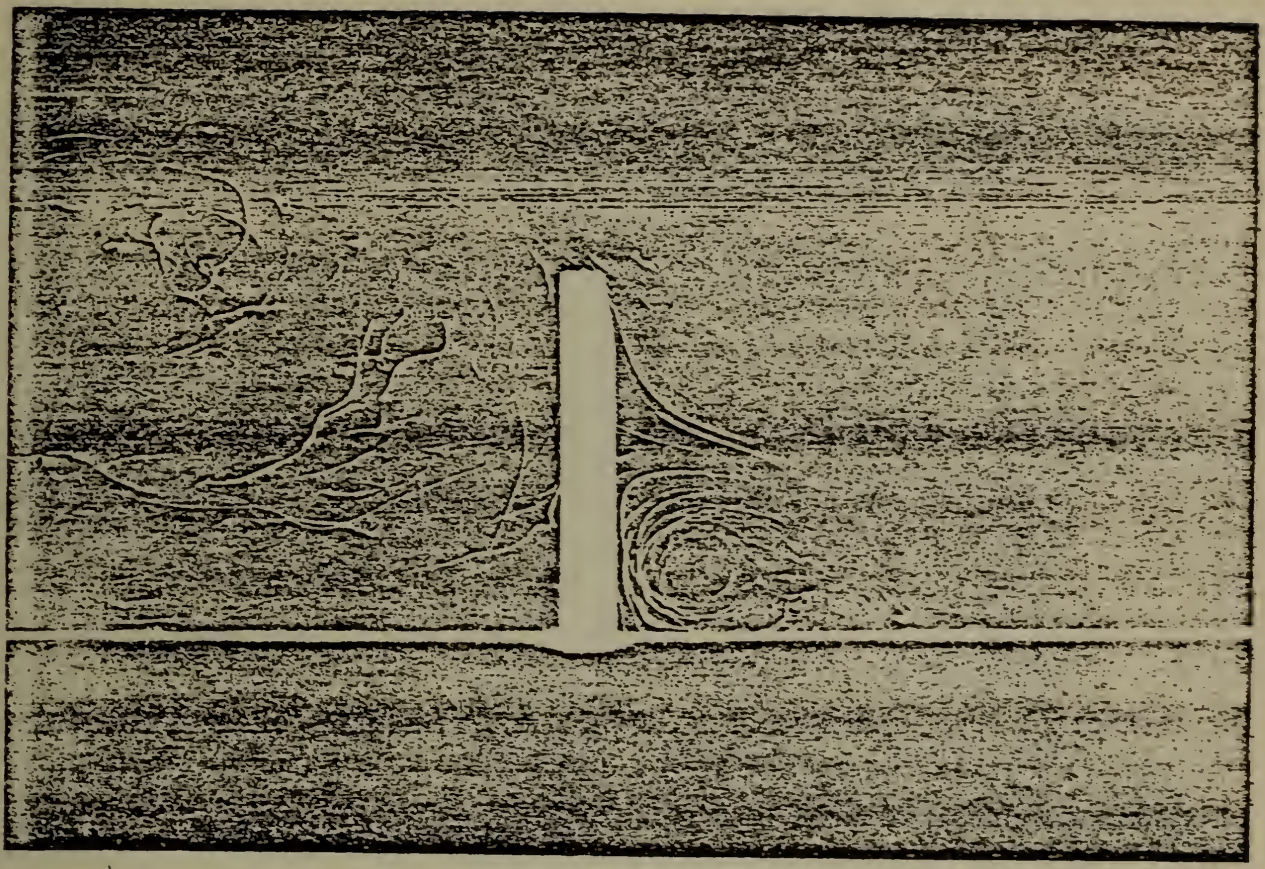


Figure 3(a) The picture shows a rectangular block model (Height:Width = 0.7) in the BBN wind tunnel. The air flow is from right to left, the white streaks show the paths of the helium filled soap bubbles which follow the air flow. Note how the air is deflected downward in front of the building from a point (in this case) about one-half the building height. It forms a standing vortex pattern in front of the building which is characterized by a relatively high speed circulating air flow.

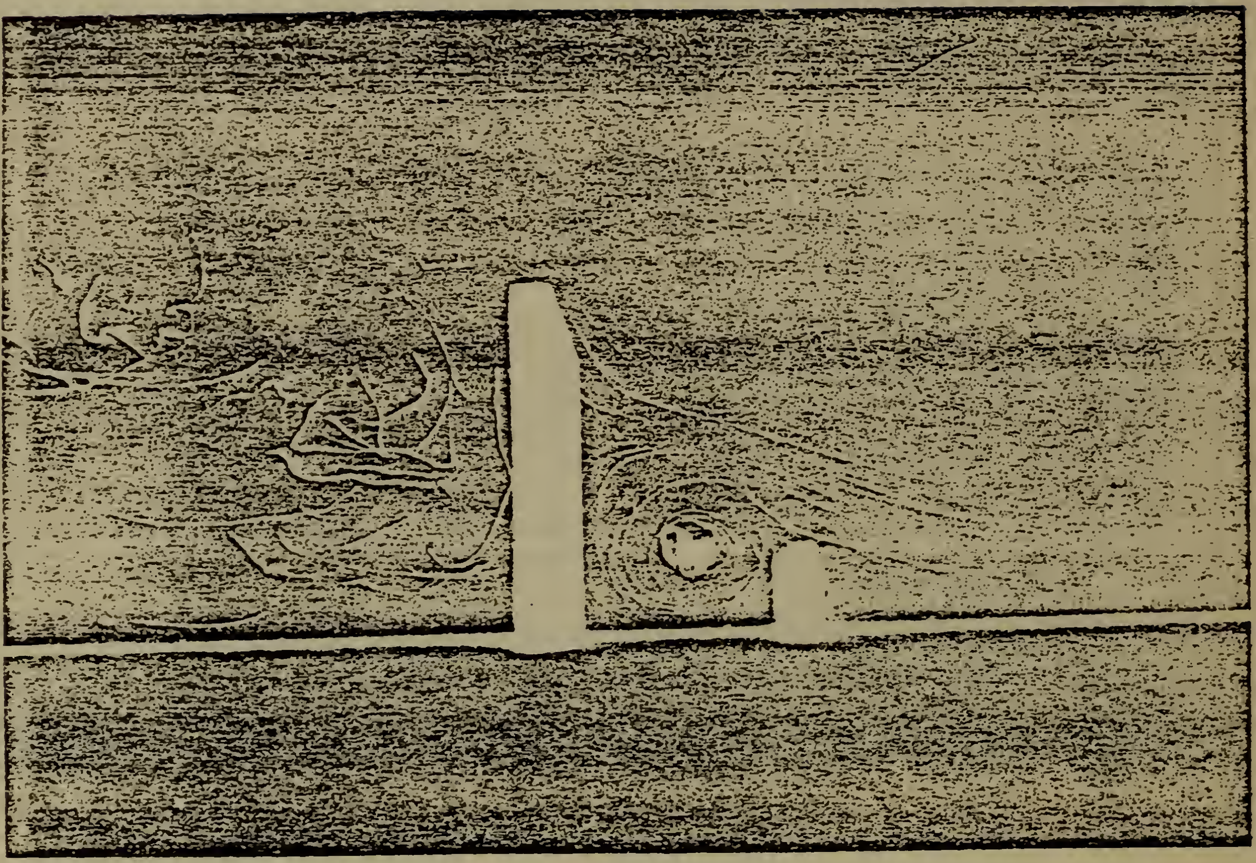


Figure 3 (b) A smaller building has been added upwind of the building modeled in Figure 3 (a). Note how the vortex is trapped in the region between the buildings, aggravating the problem illustrated in Figure 3 (a).

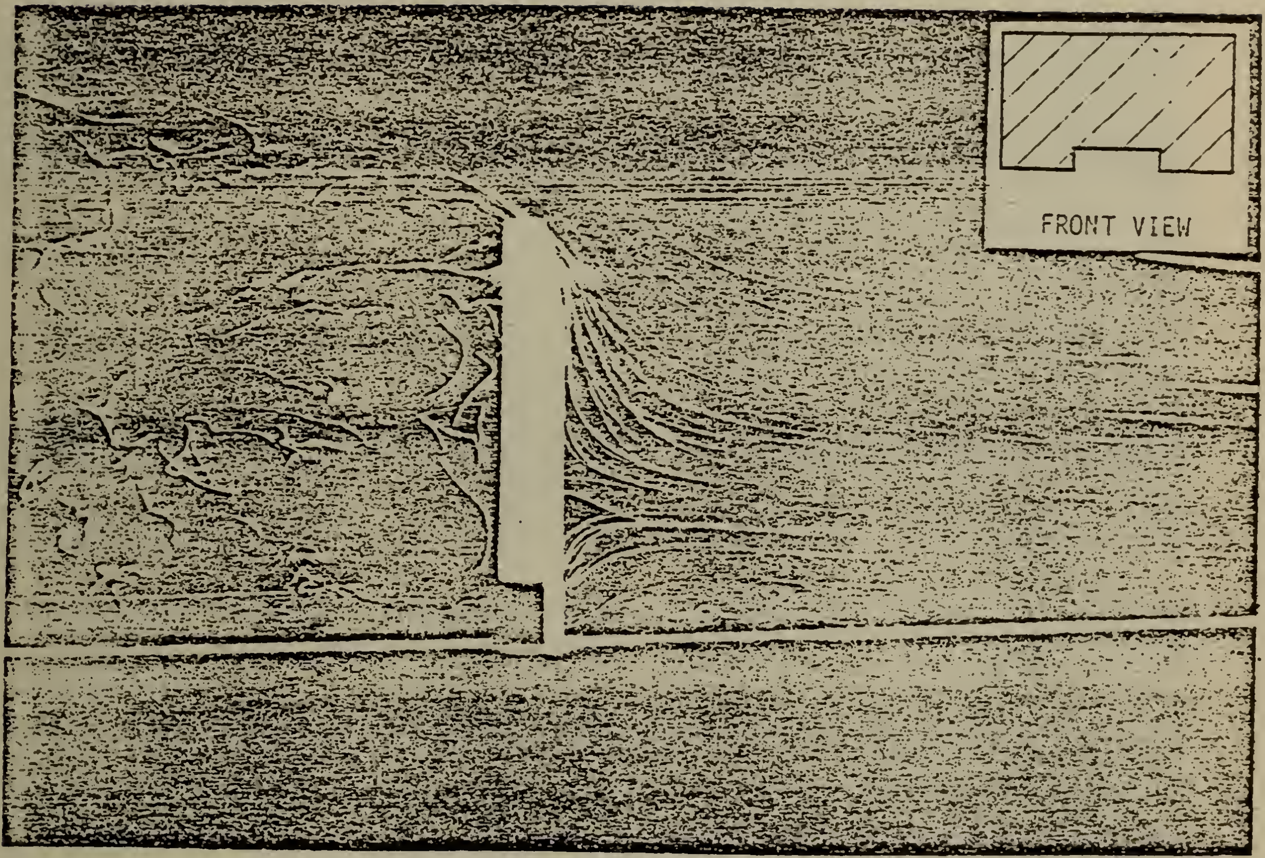


Figure 3(c) The building model is here elevated on two side pillars. The vortex has been removed from in front of the building, but the underpass can now act as a natural wind tunnel with an acceleration factor up to three.

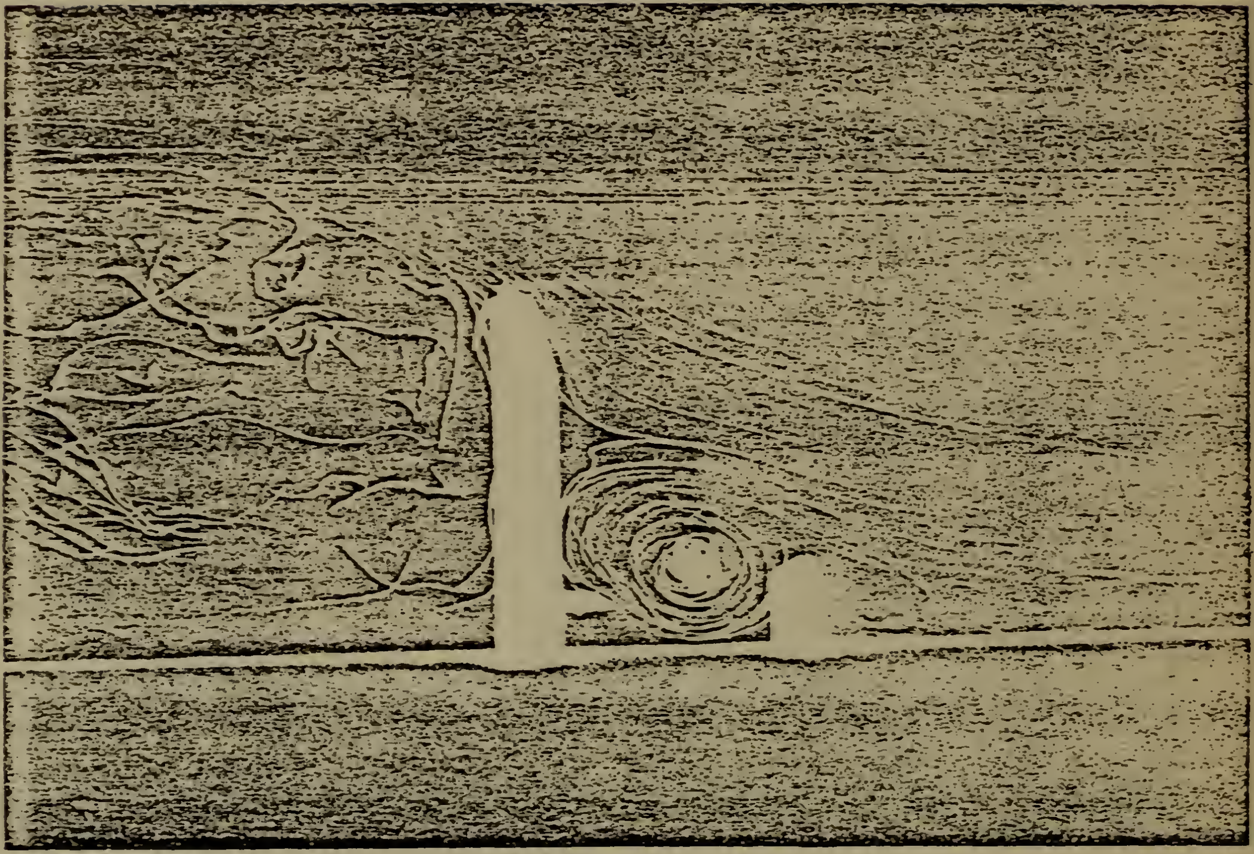


Figure 3 (d) Shows how a properly dimensioned canopy can provide shelter for pedestrians close to the base of a building.

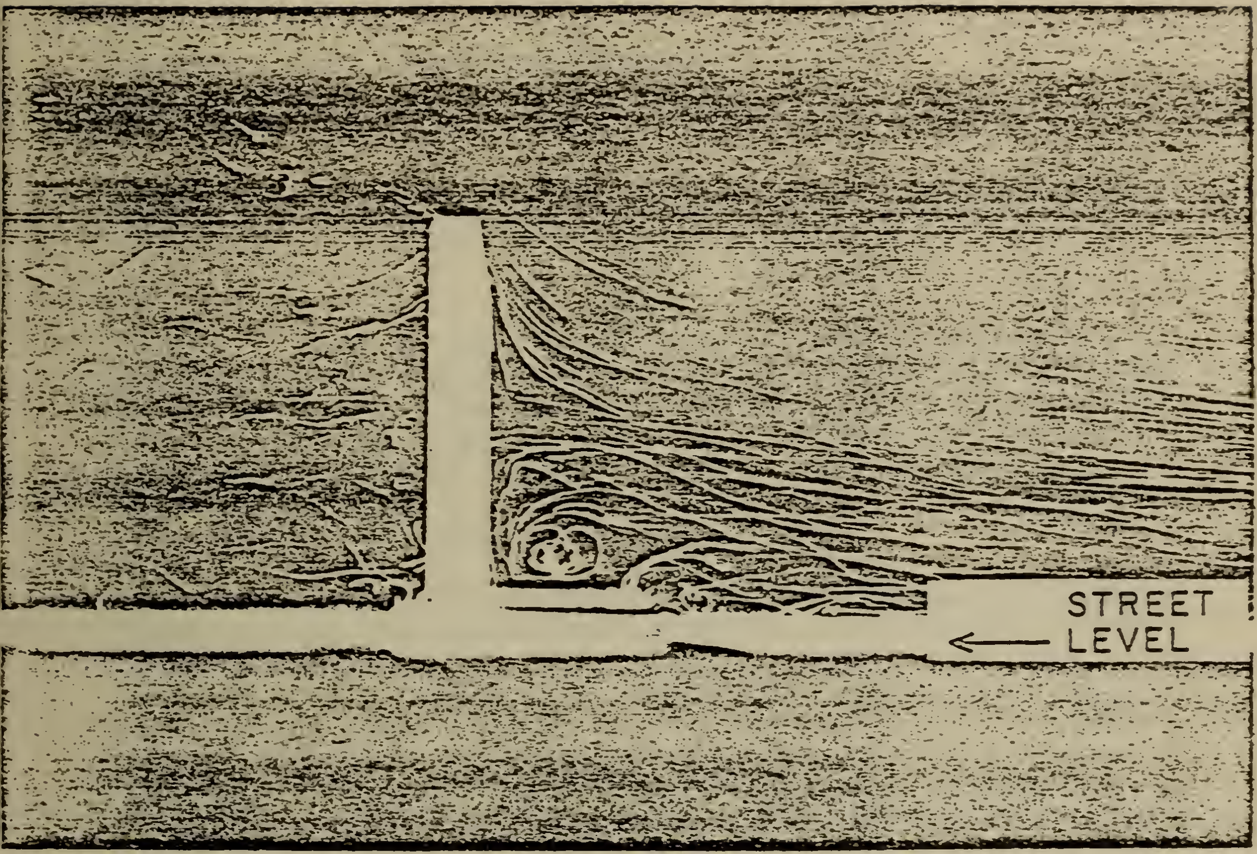


Figure 3 (e) Shows how the location of a building on a podium can allow pedestrian activity at street level to be unaffected by the downward wind flow caused by the building. However, wind speeds on the podium are increased.

CIRCULATION ANALYSIS FOR LAFAYETTE PLACE

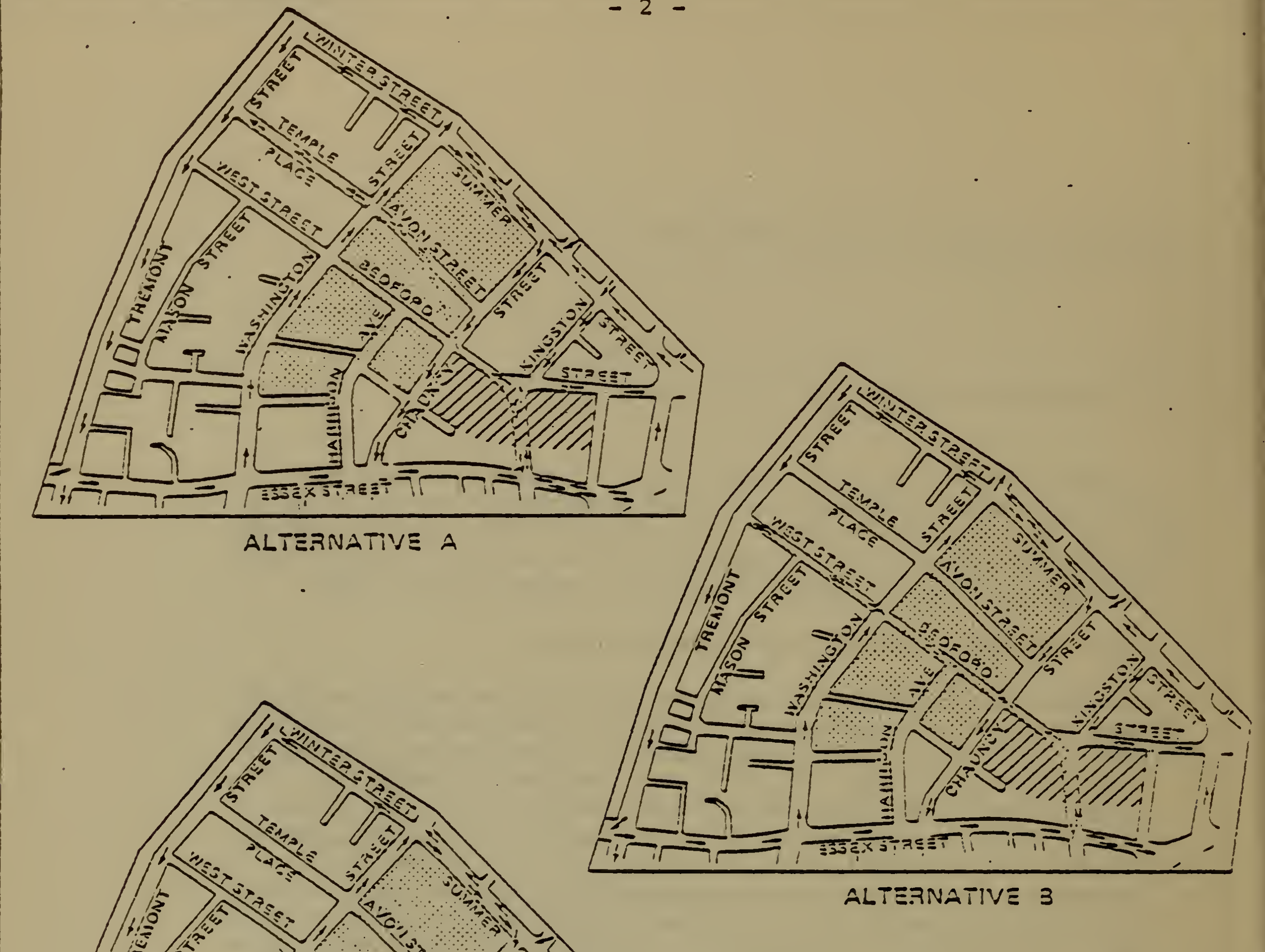
4.
ANALYSIS OF ALTERNATIVE CIRCULATION PLANS

In order to identify the best circulation scheme, a number of alternative plans were examined, with physical feasibility used as a basis for selecting the most efficient system. Each plan was thoroughly tested for traffic, architectural, and functional implications jointly with the planning team. In general, all of the alternatives meet the traffic requirements of the project and central Boston, some to a greater degree than others.

In each alternative, the following factors remained constant:

1. *Chauncy Street would remain as a southbound route:* It has been assumed that Chauncy Street would continue as a southbound street during the initial and long-range life of the project or until an appropriate connection could be provided between Arch Street and Washington Street at the north end of the central retail area. However, as a part of the project planning process, it was assumed that at some point in time, the direction of Chauncy Street would be reversed to the northbound direction. The southbound operation of Chauncy Street would fit well with the initial implementation of the Lafayette Place project prior to the redevelopment of the remainder of the downtown, since it provides circulation immediately around the project site. On a long-range basis, as more of the downtown is refurbished, the northbound operation of Chauncy Street would become more acceptable and provide a circulation system around the total area.
2. *Washington Street northbound paired with Chauncy Street:* A companion assumption to the southbound operation of Chauncy Street is that Washington Street would remain open with its total capacity used as a northbound street.
3. *A Two-way Summer Street:* It has been assumed that it will be possible to reverse one lane of Summer Street to the eastbound direction to allow circulation around the blocks immediately adjacent to the property. This is compatible with the width of Summer Street. Some of the auto drop-off activities that occur on this underutilized section of the street can be diminished after the new Lafayette Place project is developed.
4. *A Two-way Essex Street:* As a part of the new westbound street, it has been assumed that Essex Street will be widened by adding three lanes between the junction with the Expressway and Kingston Street.

The alternative schemes tested are shown schematically in Figures 10 and 11 and are discussed below. The major constraints associated with each alternative is discussed along with a short description of the new westbound alignment.



ALTERNATIVE A

ALTERNATIVE B

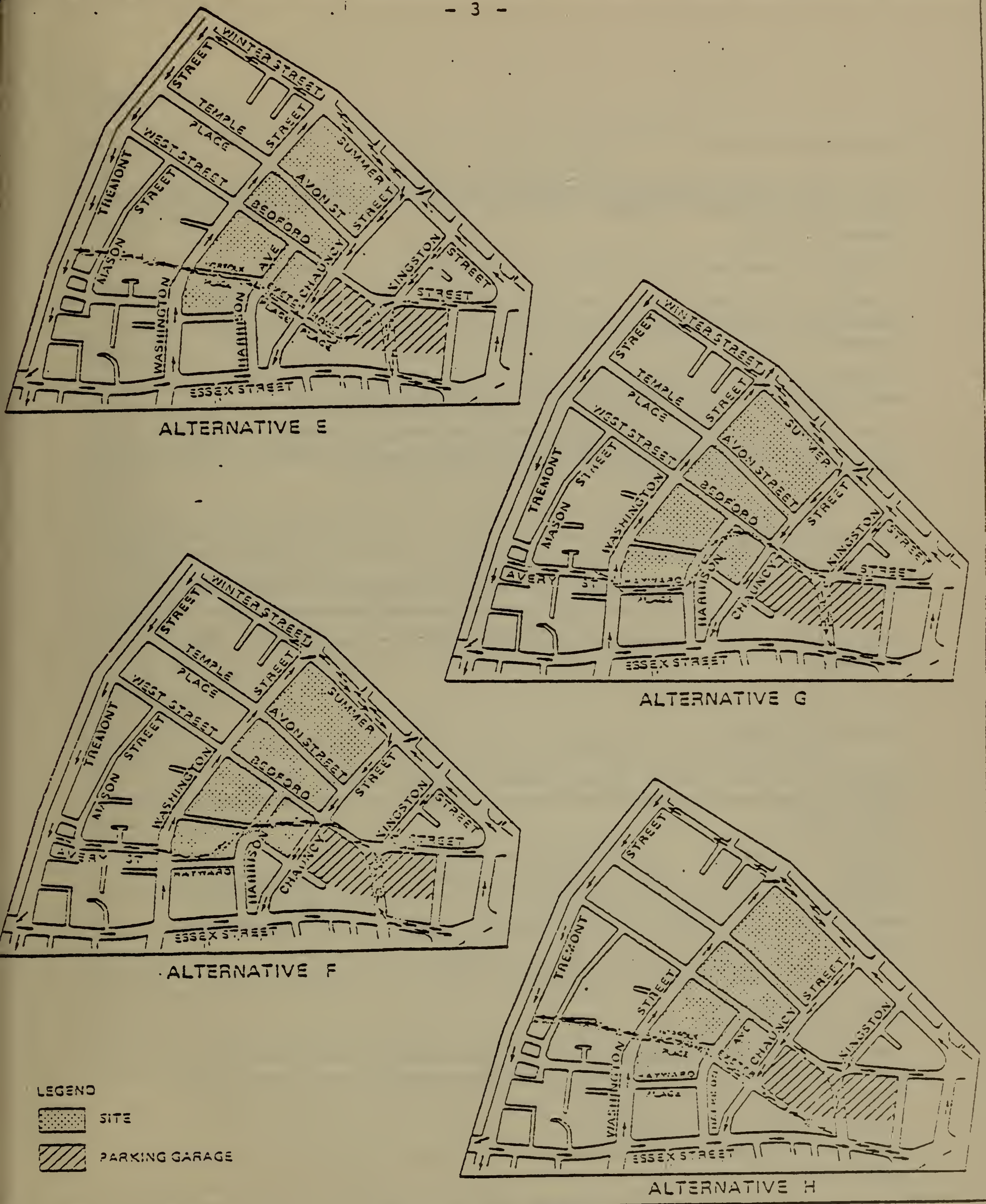
ALTERNATIVE C

ALTERNATIVE D

LAFAYETTE PLACE DEVELOPMENT STUDY
BOSTON, MASSACHUSETTS

Prepared for:
THE TAUSMAN COMPANY and SEFRI — Developers
I.M. PEI & PARTNERS and COSSUTTA & PONTE — Architects/Planners
Prepared by:
BARTON-ASCHMAN ASSOCIATES, INC. — Transportation Planners

ALTERNATIVE SCHEMES TESTED FOR NEW WESTBOUND STREET — Figure 10



ALTERNATIVE E

ALTERNATIVE G

ALTERNATIVE F

ALTERNATIVE H

LEGEND

▒ SITE

▨ PARKING GARAGE

Prepared for:
THE TAUSMAN COMPANY and SEFRI Developers
I.M. PEI & PARTNERS and COSSUTTA & PONTE Architects/Planners
Prepared by:
CARTON-ASCHMAN ASSOCIATES, INC. Transportation Planners

LAFAYETTE PLACE DEVELOPMENT STUDY
BOSTON, MASSACHUSETTS

ALTERNATIVE SCHEMES TESTED FOR NEW WESTBOUND STREET

Figure 11

Alternative A (Figure 10)

- *Description:* Existing Bedford Street, between Church Green intersection and Chauncy Street and its diagonal connection with Avon-Temple Street, would serve as the westbound corridor.
- *Constraints:* It separates the Jordan Marsh Store from the rest of the complex.

  It would not be identified as a westbound corridor supplementing the eastbound movement on Essex Street and thus the continuity of the east-west movement would be disrupted.

  The large number of vehicles turning left from Kingston Street onto Bedford Street would cause the intersection to operate at an unacceptable level of service.

  It would require: (a) removal of parking from Bedford Street, (b) widening of Kingston Street to serve as four-lane, two-way street between Essex and Bedford, and (c) commitment by the city to achieve a three-lane wide Temple Street.

Alternative B (Figure 10)

- *Description:* Existing Bedford Street would serve as a westbound corridor midway through the project, ultimately connecting with West Street past Washington Street.
- *Constraints:* Alternative B is characterized by the same set of constraints as identified in Alternative A.

Alternative C (Figure 10)

- *Description:* Existing Bedford Street, between the Church Green intersection and Chauncy Street, would be extended in a westbound direction through the project up to Tremont Street.
- *Constraints:* Alternative C is characterized by the same general set of constraints identified in Alternatives A and B, although it presents a better identification as a westbound counterpart to Essex Street. Additionally, it would require the acquisition and demolition of a few important structures along the alignment of the new westbound street.

Alternative D (Figure 10)

- *Description:* Existing Bedford Street between the Church Green intersection and Kingston Street would be realigned in a southerly direction up to Chauncy Street, following the general direction of Exeter Place and Exeter Place would be extended in a westbound direction up to Tremont Street.
- *Constraints:* Alternative D is characterized by the same set of constraints as identified in Alternative C.

Alternative E (Figure 11)

- *Description:* It has an alignment very similar to that of Alternative D with the exception of a sharper curve connecting Exeter Place with Bedford Street.
- *Constraints:* Alternative E is characterized by the same set of constraints as identified in Alternative D.

Alternative F (Figure 11)

- *Description:* Existing Bedford Street, between the Church Green intersection and Chauncy Street, would be extended diagonally to connect to Hayward-Avery Street.
- *Constraints:* Alternative F is characterized by a set of constraints, some of which are very similar to those identified in Alternative E, such as a large number of left-turning vehicles at the intersection of Kingston Street and Bedford Street, need to remove parking from Bedford Street, and need to widen Kingston Street. Other major disadvantages are as follows:

  a. It would require construction of a new three-lane street between Chauncy and Washington Street; this would result in a substantial loss of gross leasable areas. Also, parcels of land created as a result of the diagonal connector may not land themselves to a suitable land use pertinent to the project.

  b. The new Bedford Street would result in a "zig-zag" alignment and would tend to lose its identity as a westbound counterpart to Essex Street.

Alternative G (Figure 11)

- *Description:* It has an alignment similar to that of Alternative F with some minor modifications.
- *Constraints:* Alternative G is characterized by a set of constraints that are very similar to those identified in Alternative F.

Alternative H (Figure 11)

- *Description:* Essex Street would be widened between its junction with the expressway and Kingston Street for the westbound movement, follow the general alignment of Rowe Place-Exeter Place and continue in a westerly direction past Washington Street up to Tremont Street.
- *Constraints:* Besides separating the second department store from the rest of the retail complex, it would require acquisition and demolition of a few important structures for the new three-lane street between Washington and Tremont Street.

5.

RECOMMENDED PLAN

It is evident from the discussions in the previous chapter that not all of the schemes tested are immediately achievable, and most of them require significant expenditures of public and private funds. Some of the schemes have obvious advantages over the others in terms of ability to circulate traffic, identification with the project, and feasibility regarding acquisition of necessary structures, especially with respect to costs. Therefore, it appears that the most desirable course of action is to select the best ultimate arrangement and develop an interim solution that is acceptable. The process of choosing the most desirable and feasible alternative was an effort of the total planning team.

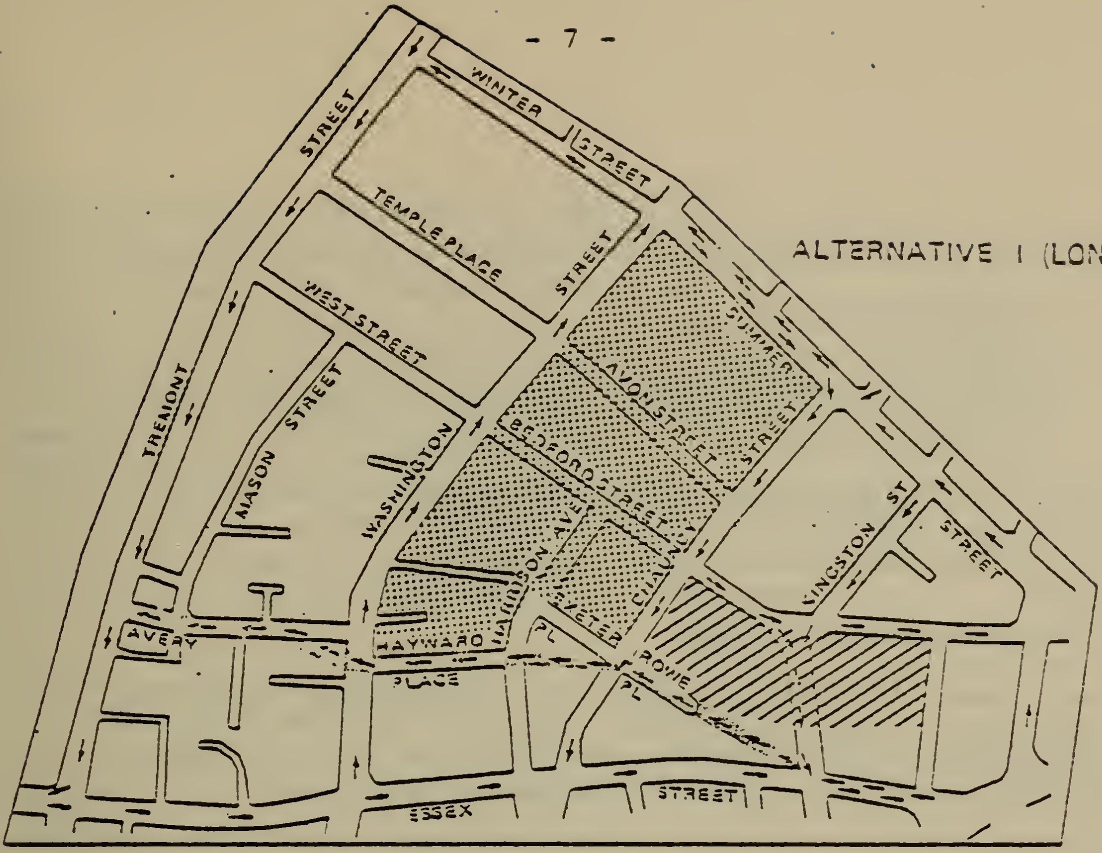
Circulation

The most logical circulation system would be the one that would not separate the site into two parts and that would insure efficient east-west circulation along the southern edge of the project site. In order to maintain continuity of the site area, it is necessary that Avon Street and Bedford Street be closed between Chauncy and Washington Street. An ideal solution to the circulation problem would be obtained by converting Essex Street to two-way operation by adding three westbound lanes. However, because of the structures located on Essex Street it is impossible, at this time, to acquire sufficient right-of-way along Essex Street to add three additional lanes, extending to Tremont Street on the west.

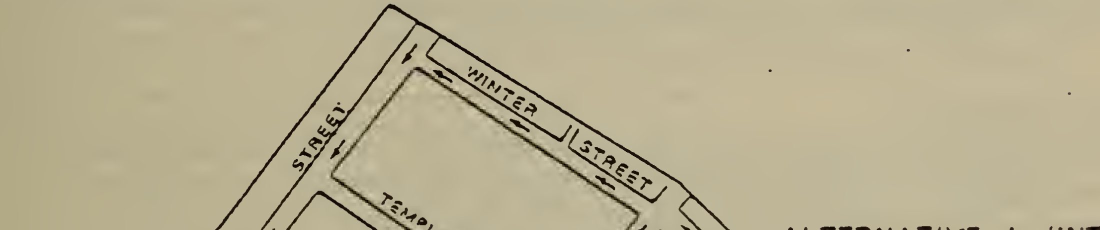
Long-range Circulation Plan

Under the constraints mentioned above, Alternative H probably presented "next best" alternative from a circulation point of view, although it has the serious deficiency of interrupting the main floor with vehicular flow. A decision was made at this point, by the project team, to align the new westbound street along Rowe Place-Exeter Place and then through the existing structures between Chauncy and Washington Street and continue along Avery Street (Alternative I, Figure 12).

The long-range circulation plan also calls for realigning the eastern end of Avery Street by a smooth curve. This would alleviate the problems associated with the operation of the existing offset intersection at Washington Street and Hayward-Avery Street. The status of the structures currently located on the southern side of Avery Street indicates that no major



ALTERNATIVE I (LONG RANGE)



ALTERNATIVE J (INTERIM)

LEGEND

░ SITE

▨ PARKING

LAFAYETTE PLACE DEVELOPMENT STUDY
BOSTON, MASSACHUSETTS

Prepared for:
THE TAUBMAN COMPANY and SEFRI — Developers
I.M. PEI & PARTNERS and COSSUTTA & PONTE — Architects/Planners
Prepared by:
BARTON-ASCHMAN ASSOCIATES, INC. — Transportation Planners

RECOMMENDED SYSTEMS

Figure 12

problems would be encountered in the future acquisition of the structures. In case the acquisition of the said structure is not immediately feasible, two alternative arrangements are suggested:

(1) 'Do Nothing' Alternative - implying that the intersection will continue to operate as an offset intersection.

(2) Modification of Hayward ~~Street~~ Place - implying that the alignment of the westbound street along Hayward Place be modified such that a perpendicular intersection is established. This may result in some loss of the gross leasible area of the retail space.

This alignment does not have all the merits of the ideal solution of converting Essex to a two-way street. But under the given physical and economic constraints, Alternative I presented the best ultimate solution, both from a development and a circulation point of view. Alternative I is thus recommended as the ultimate circulation plan. The key circulation features of the plan are as follows:

- A portion of Essex Street between its junction with the expressway and Kingston Street would be provided for westbound movement. It would follow the general alignment of Rowe Place, continue through the block between Chauncy and Washington Street, and ultimately connect with Tremont Street following the Avery Street alignment.
- The direction of Bedford Street would be reversed in an easterly direction to provide for adequate circulation around the proposed garage and its connection with the expressway.

Interim Circulation Plan

Questions were raised during the course of this study as to the feasibility of acquisition of the properties & structures between Washington St. and Chauncy St. As such, the use of the present Exeter Place and Hayward Place corridor, connected by a sharp curve, is suggested as the alignment of the westbound street, only as a temporary arrangement (Alternative J, Figure 12). The key features of the interim circulation scheme are as follows:

- A portion of Essex Street would be widened between its junction with Kingston Street and the expressway; it would follow the alignment of Rowe Place and Exeter Place and connect with Avery Street past Washington Street.
- The direction of Bedford Street would be reversed in an easterly direction to provide for adequate circulation around the proposed garage and its connection with the expressway.

Geometric Design

Features common to the initial and long-range plan: Detailed geometric design for the recommended street system (both initial and long-range), is shown in Figures 13 and 14, respectively. The significant features of the circulation schemes that are common to both of the plans are outlined as follows:

1. Avon Street and Bedford Street would be closed between Washington and Chauncy Street in order to maintain an uninterrupted site area.

2. Harrison Street, north of Exeter Place, would be closed.

3. The existing offset intersection at Chauncy-Arch and Summer Street would be modified by a curve connecting Chauncy with Arch Street.

4. Three moving lanes would be provided on Chauncy Street between Summer Street and Bedford Street. Ultimately a four-lane cross section will be required for Chauncy Street if the use of Washington Street as a traffic carrier is curtailed. Wherever possible, additional lanes should be provided along Chauncy Street to help meet this objective. For example, three lanes would be provided from Summer Street to the new street with provision for a four-lane right-of-way. In some instances, this would result in non-functional traffic lanes during the interim period prior to diminishing the use of Washington Street.

5. An eastbound lane would be added on Summer Street between Washington and Chauncy Street to facilitate round the block circulation and truck access.

6. At the western edge of the parking garage, access to the garage would be provided by a left-turn lane from Essex Street. For the return westward trips, the outbound ramp from the garage would have direct connection with the new westbound street.

   At the eastern end, access to the garage would be provided directly from the proposed westbound Essex Street, as shown. The outbound ramp would be connected to Bedford Street.

   Bedford Street would be operated as an eastbound street. Generally, the ramp system at the western end would provide access to vehicles from the west, southwest, and northwest. The other ramp system would serve vehicles from the expressway (both south and north), the turnpike, and the local north-east direction.

7. A westbound lane would have to be added on Boylston Street west of the intersection with Tremont Street in order to alleviate some of the traffic congestion problems. A study conducted in 1988 for the BRA indicated that with public approval, it is feasible to add such a lane, although this would need special reinforcing of the MBTA tunnel located below.

   The performance of the intersection may be further improved by the addition of a separate right-turning lane about 300 feet in length, on Tremont Street, north of the intersection with Boylston Street.

Special features of initial circulation scheme: These are shown in Figure 13 and outlined as follows:

1. A new three-lane westbound lane would be provided that runs contiguous and parallel to Essex Street between the surface artery and Kingston Street. It would follow the alignment of Rowe Place and Exeter Place, connect Hayward Place with a curve, and follow the general alignment of Avery Street up to Tremont Street.

Special features of long-range circulation scheme: These are shown in Figure 14 and outlined as follows:

1. An ultimate three-lane westbound lane would be provided that runs contiguous and parallel to Essex Street between the surface artery and Kingston Street. It would follow

the alignment of Rowe Place-Exeter Place, continue in a westerly direction through the block between Harrison and Chauncy Streets, and follow the general alignment of Hayward Place and Avery Street terminating at Tremont Street. The existing offset intersection at Washington Street and Hayward-Avery Street would be modified by realigning the eastern end of Avery Street.

2. Changes envisioned by the BRA in the alignment of the Surface Artery have been incorporated in Figure 14.

3. The scheme presented in Figure 14 is compatible with proposed changes in direction of South Street and would connect with the freeway southbound on-ramp, using Atlantic Street as a connecting link with the off-ramp from the turnpike.

Truck Access Route

It was estimated that the truck traffic associated with the project would consist of approximately 40 inbound vehicles and 40 outbound vehicles during the peak hour. Of this total, approximately 30 percent were estimated to be the larger tractor trailers. The above figures reprent a conservative estimate, that is adequate for design purposes, since the peak truck traffic for the three functional land-uses in the project are not likely to occur at the same time during the day.

A truck ramp and loading dock area was proposed by another consultant as a part of the project team. No specific problems were foreseen relative to the capacities of the ramps and at the intersections at each end of the ramps. The larger vehicles could pose a problem if a number of these were to arrive at either the base or at the top of the ramps at the same moment. This, again, is unlikely to happen because of the basic conservative estimates.

In terms of the operation of the street system, it is proposed that truck traffic unloading or loading be prohibited in the CBD area during the morning and afternoon peak periods. No major operational problems are anticipated if the truck movements are allowed to take place only during the off-peak hours.

Exerpted from: Barton-Aschman Associates, Inc., Site Analysis - Lafayette Place, Boston, Massachusetts, prepared for SEFRIUS, Developers, Washington, D.C., July 1974.

EVOLUTION OF THE BOSTON AUTO RESTRICTED ZONE PLAN

2.2.3 Detailed Planning for the Demonstration

Detailed planning for the Boston ARZ demonstration was conducted primarily by the four UMTA consultants (Alan M. Voorhees and Associates: Cambridge Systematics: Moore-Heder Architects: and A.T. Kearney), with assistance from the City (Boston Redevelopment Authority, Traffic and Parking Department, Mayor's Office) and the Central Transportation Planning Staff and with overall direction from UMTA. The first working meeting between the UMTA consultants and the City was held on April 27, 1976. Consultant and agency working relationships were clarified, with Emily Lloyd, the Mayor's Transportation Advisor, designated as the coordinator of formal communications and the BRA responsible for day-to-day working contacts with the consultants. The Mayor's Office was to provide the consultants with policy inputs, while the BRA would provide technical support.

Three ARZ proposals were initially considered by the consultants. At one extreme was the so-called Tremont-Purchase scheme which would have restricted auto traffic throughout the entire CBD. It was initially supported by Moore-Heder and Traffic and Parking Commissioner Will Noonan, but was quickly dropped from consideration because of its political infeasibility. The most modest proposal was the so-called Devonshire-Congress alternative, which channeled traffic to the periphery of the retail district.

The modest Devonshire-Congress alternative was chosen as a point of departure for further generation of traffic circulation alternatives. Three variations on this alternative were studied by the consultants, with each subsequent iteration resulting in a smaller area of auto restriction. The so-called Scheme F was the plan produced at the end of the consultants four and one-half month planning study. Figure 3-16 shows Scheme F in which Summer, Winter, Washington, Hawley, and portions of Chauncy Street were to be closed to auto traffic.

The consultants also produced a "Transit Plan D". The Plan, which was included along with traffic Scheme F in the consultant's final report, recommended changes in the MBTA system as well as the provision of a new shuttle bus system. The changes recommended for the MBTA centered around increasing local and express bus penetration into the CBD. The recommended shuttle system was to improve accessibility from outlying parking garages and among activities in and around the retail and financial district.[1]

Although the City of Boston viewed the consultant's final plan as technically feasible for the most part,[2] developments occurring after

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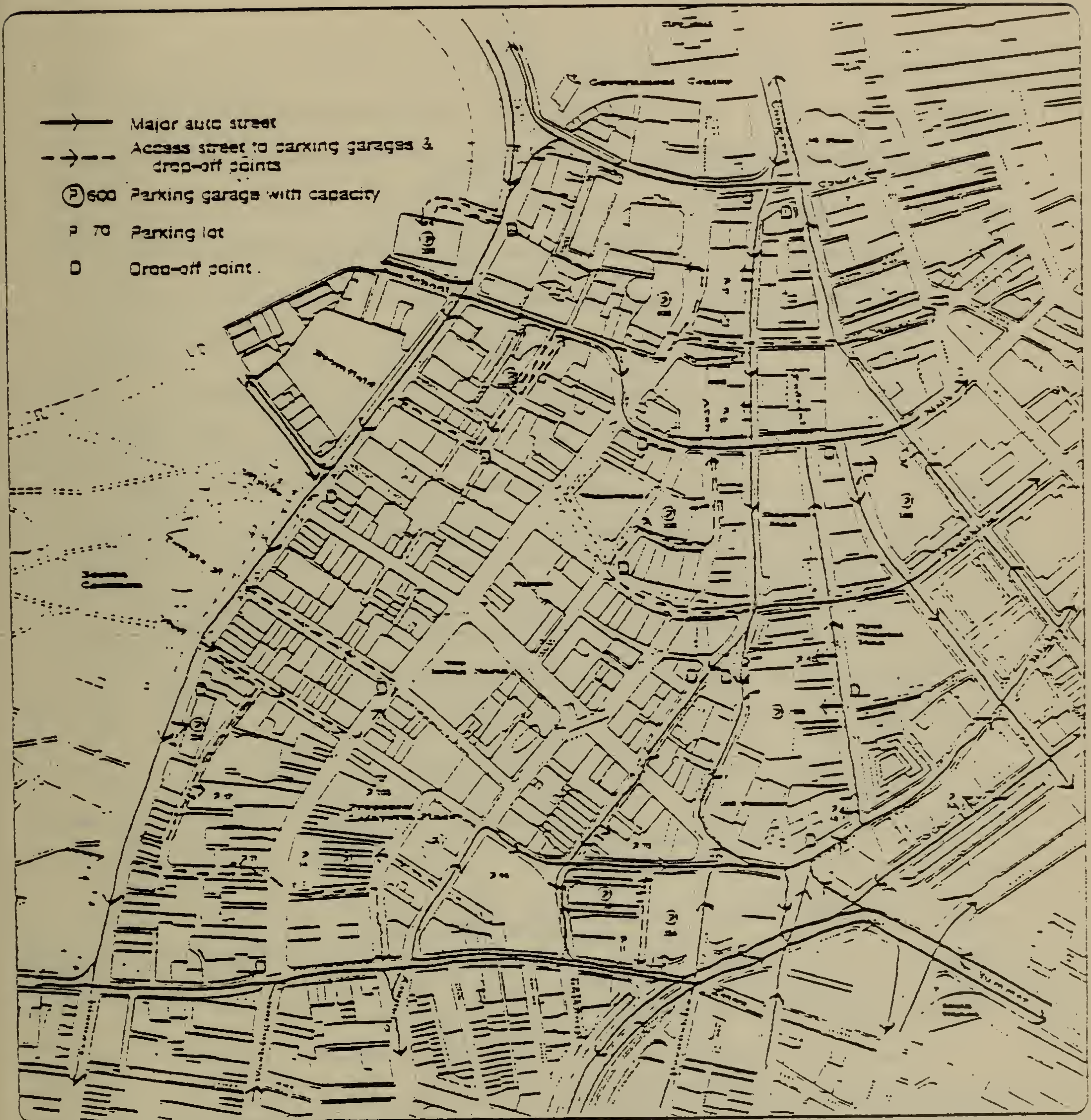
[1] Lajos Heder, Moore-Heder, "Technical Memorandum--Boston ARZ Preliminary Design Concept," to ARZ Consulting Team Members, (Cambridge, Mass: June 18, 1976)., p.3.

[2] One exception was the consultant's recommended closing of Chauncy Street Street from Summer to Milk Streets. The BRA's Urban Designer argued that a car-free Chauncy Street would not be utilized by pedestrians.



BOSTON AUTO RESTRICTED ZONE STUDY

FIGURE 2-16: Auto Circulation - Scheme F

the consultants completed their final plan induced the City to perform another iteration to reduce the scope of the project. Downtown merchants were becoming increasingly wary of major changes in the retail district, particularly after Gilchrist's department store closed in January 1977. The construction of Phase I of the Washington Street Mall (between Court Street and City Hall) took longer than anticipated and caused some controversy about further disruptions to the street system. Funding possibilities for the ARZ project were lessened when the City failed to receive Public Works funds from the Economic Development Administration (EDA) and found it could not use a local urban renewal bond issue. Strong political trends for economizing in city government caused further pressure for cutting the scope of the ARZ project.

Because of these difficulties, the City proposed a less restrictive ARZ scheme. Working with assistance from the consultants, the City proposed "Scheme G" as shown in Figure 2-13. In Scheme G, the plan which will be constructed beginning in July, Chauncy and Arch Streets will carry northbound traffic to Milk Street; Milk will become westbound only from Arch to Washington; Washington Street will remain open to northbound circulation north of Milk; School Street traffic heading east will be diverted to Water Street; and a short section of School Street next to the Boston Five Bank will be closed.

Scheme G was supported primarily by the Mayor's Office. The Boston Redevelopment Authority had argued for a less restrictive scheme, Scheme G-13, which is similar to Scheme G except that it opens Franklin-Bromfield to westbound traffic only (no turns on Washington Street).

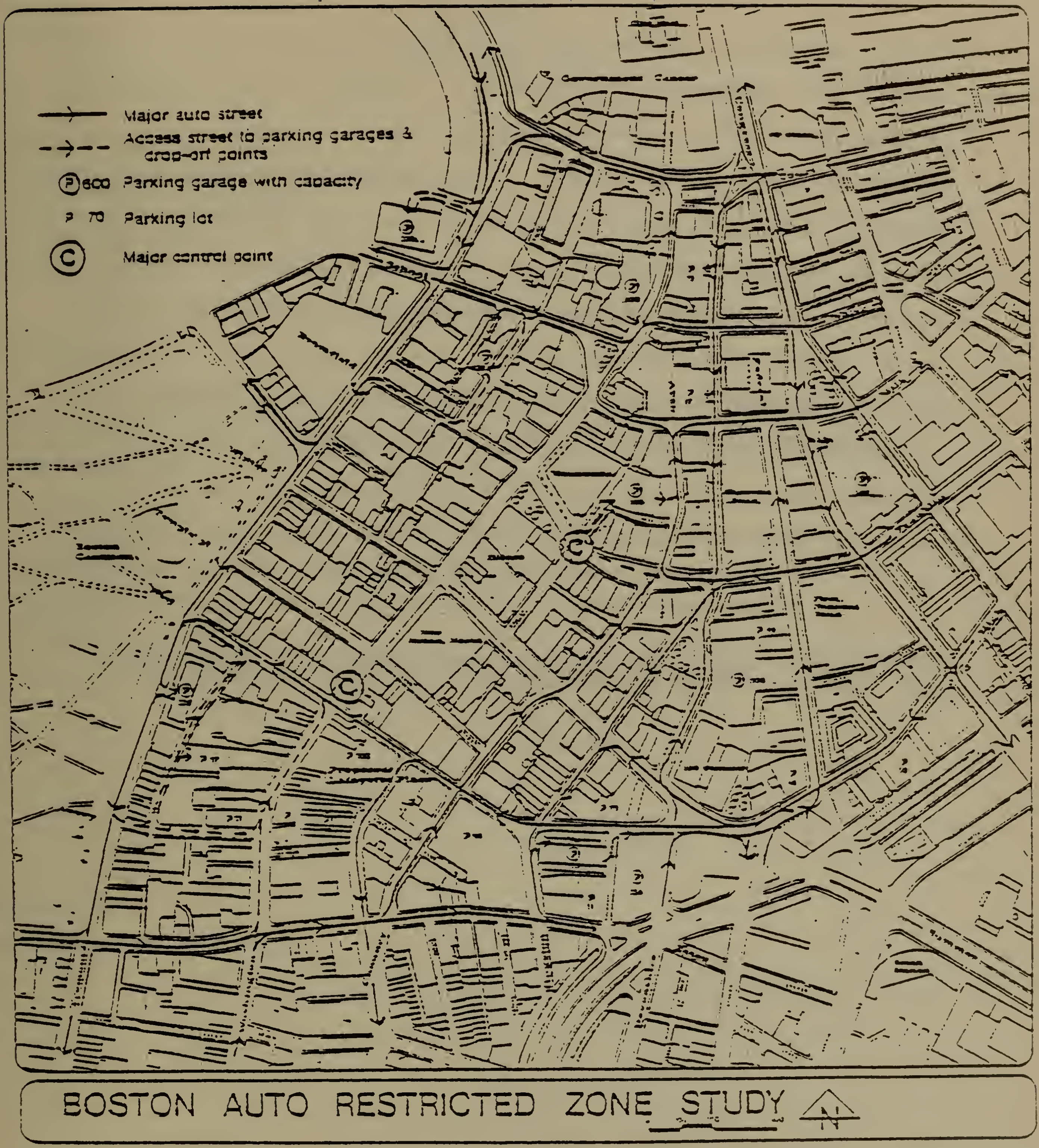

Major auto street
Access street to parking garages & drop-off points
P 600 Parking garage with capacity
P 70 Parking lot
C Major control point
Government Center
BOSTON AUTO RESTRICTED ZONE STUDY
N

FIGURE 2-17: Auto Circulation - Scheme G

The BRA had prepared a memorandum analyzing the advantages and disadvantages of these alternatives for discussion at a February 16, 1977, meeting with the Mayor's Office. However, representatives of the Mayor's office declined to discuss the BRA proposal. At this time, Traffic Commissioner Noonan was supporting a third alternative known as Scheme G-23. This scheme was the least restrictive of the "G" schemes considered. It would have opened Bromfield to westbound traffic and left Washington Street open to traffic between Franklin and Milk. Further, buses would be routed on Washington to Milk, looping via Devonshire and Franklin back to Washington Street. Express buses would use Hawley between Franklin and Summer, rather than Arch. However, this scheme was never seriously considered.

Exerpted from: Boston Auto Restricted Zone Demonstration - Evaluation Plan (draft), Cambridge Systematics, Inc., Cambridge, August 1978.

BOSTON WATER AND SEWER COMMISSION
10 POST OFFICE SQUARE
BOSTON, MA 02109
(617) 426-6046

October 20, 1978

Thomas C. McMahon, Director
Division of Water Pollution Control
Water Resources Commission
Commonwealth of Massachusetts
110 Tremont Street
Boston, Massachusetts 02108

Subject: Adequacyof existing sewerage works C.B.D. Downtown

Dear Mr. McMahon,

It is a matter of Commission policy that the adequacy of the existing sewer system to accept additional flow be determined by the party proposing such connection.

The Boston Redevelopment Authority is familiar with the existing sewerage system in this area and after having discussed their proposed development with our engineering staff, they apparently anticipate no problems due to increased flow.

Sincerely,

Thomas Ennen, Director
Sewer Division

TNN/EFP:jo
cc: Wallace B. Orpin, BRA

ACKNOWLEDGEMENTS

This Final Environmental Impact Statement was prepared by the Environmental Review Section of the Boston Redevelopment Authority with the assistance of the following departments of the Authority:

Downtown Development
Engineering
Research
Transportation Planning
Word Processing

Consultant services for this Statement were provided by the following:

Parsons Brinckerhoff Quade & Douglas, Inc. (air quality monitoring study)

Bolt Beranek and Newman, Inc. (air quality impact analysis)

The following agencies and groups were consulted in the preparation of this Statement:

Federal

Environmental Protection Agency, Region I
    Air and Hazardous Materials Division

State

Massachusetts Bay Transportation Authority

Local

Boston Sewer and Water Commission

Private

Boston Edison Company
Mitchell/Giurgola, Associates
SEFRIUS Corp.

Richard B. Mertens, Environmental Review Officer, BRA
Joseph J. Berlandi, Director of Downtown Development, BRA
James J. Derba, Jr., Lafayette Place Project Coordinator, BRA

City of Boston

Kevin H. White, Mayor

Boston Redevelopment Authority

Robert L. Farrell, Chairman
Joseph J. Walsh, Vice-Chairman
James G. Colbert, Treasurer
James K. Flaherty, Assistant Treasurer
James E. Cofield, Member

Kane Simonian, Secretary
Robert J. Ryan, Director

Downtown/xing
B65R
1978

AUTHOR
Lafayette Place Part B

TITLE

DATE LOANED	BORROWER'S NAME